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EDITORIAL.

In our first issue a number of inexcusable errors occurred. One of the cuts in the article by Doctor Watkins was up-side-down and a cut that should have accompanied the article by Doctor Vance was made to appear as being a part of Doctor Watkins' article. An advertisement was placed in the body of the magazine among the reading pages. The Editor-in-Chief assumes full responsibility for the errors. In our anxiety to get the first number out and into the mails we accepted some one else's "O. K." to save time, with the result as above mentioned. A more careful survey of the make-up will be given in the future and such unpardonable errors eliminated.

Just here the Editor-in-Chief desires to call the attention of the secretaries of the various county societies to the necessity of having material for publication in the hands of the associate editors in ample time for publication each month. The many details of the new Journal have demanded time in their adjustment and have made delays impossible. In the future these delays should not occur, and material for publication must be on time to find place in the issue each month. The associate editors have been asked to have their copy in the hands of the Editor-in-Chief not later than the 28th of the month preceding the issue. With this date in mind the secretaries should act accordingly.

FOCAL INFECTION AS A POSSIBLE CAUSE OF EXOPTHALMIC GOITRE.

The true etiological explanation of the hypertrophy and over-activity of the thyroid gland accompanied by the triad symptoms of exophthalmic goitre yet remains obscure.

Clinical evidence is gradually accumulating that both hyper- as well as hypo-thyroidism is the result of bacterial, or amoebic infection or sudden excessive metabolism.

The endocrine group of glands—Sajous' "adrenal system"—Eppinger, Falta and Rudinger's "chromaffin" system, consisting of the thyroid,

pituitary and adrenals play an important part with the general protective mechanism of the body.

Careful clinical observation of long standing, moderately virulent infections, such as chronic bronchitis, pulmonary tuberculosis with long-existing abscess cavities, follicular tonsilitis, sinusitis, pyorrhoea alveolaris, intestinal amoeba, fairly severe, will demonstrate an amazing number of patients having hypertrophy of the thyroid glands.

Goitre Commissions have elicited the fact that if the water in endemic goitrous districts be boiled, animals experimented on with it will not develop goitre. Those given the same water, unboiled, will shortly develop goitre symptoms. Boiled water contaminated with the feces from one who has developed goitre will produce the disease in goats, while the filtered residue of water from districts in which goitre prevailed produced the same result in man and goats, namely, goitre.

This leads the student to infer that the water must contain some infectious product, filterable and destroyable by heat, one of the amoeba being most likely.

Walkerton (Amer. Med., Dec., 1916) proves to his own satisfaction that amoebic infection is the cause of goitre. Having in his cases eliminated the amoeba from the system, the enlarged thyroid returned to normal.

Also goitrous, sterile women, after the same treatment, become pregnant.

For twenty years he studied the disease in his own district, where it is endemic. He found it even in the fish in two small streams, and mothers gave birth to goitrous babies, which set him to thinking that a damaged placenta might allow some infective agent to filter through and infect the foetus.

There was the theory of lime in the water, but only certain residents were affected. As to lime, the disease is endemic in other Ontario districts where only granite is.

When he first came he was interested in breeding dogs, but the fine, imported ones gave place to goitrous stock in two or three removes. A whole litter would prove goitrous. Imported cows, horses, pigs, would suffer the same way.

He made a microscopic examination of the alvine secretions of animals and humans, and found amoebae in all.

Amoebae are present in drinking water; but, he asks, are they the same?

His father settled as a doctor in Walkerton fifty years ago. Among the first settlers, goitre was very uncommon. The next generation—whole families—showed thyroidism and he has now a wide-spread amoebic infection regarded as pathogenic. The third generation are often goitrous scrubs, without vitality, virility or ambition.

In ancient times, Pliny, in his NATURAL HISTORY, (XI, 68) observes: "Only men and swine are subject to swellings in the throat, which

are mainly caused by the noxious quality of the water they drink." Juvenal (XIII, 162) says: "Who wonders at goitre in the Alps?"

Paracelsus, in the sixteenth century, found goitre to be endemic in the Salzburg district, and attributed it to metallic constituents in the water.

Excessive fatigue, fright, mental strain, each produce toxic processes through rapid tissue waste and have been observed to promptly develop exophthalmic goitre in both man and animals.

Rothasker reports thyroid symptoms going on to exophthalmic goitre in healthy soldiers subjected to physical and psychic overstrain in the present war and in the Boer war, while the same has been seen in amateur mountain climbers, and horses excessively galloped.

With regard to intestinal infection, McCarrison believes the toxic factor is infection from the gastro-intestinal tract. He has been able to cause complete disappearance of goitre by using vaccines prepared from normal organisms in the bowel.

His hypothesis is supported by Arbuthnot Lane, who believes that goitre, both simple and toxic, can be cured by short-circuiting the large bowel. Pathogenic bacteria induce excessive activity of the thyroid. An important function of the gland is, by its internal secretions, to neutralize circulating toxins, so, as Lane points out, continued stimulation of the gland must result either in exhaustion and atrophy, or adenomatous growths.

He operated for intestinal stasis on a girl who, for eight years, had had an enlarged thyroid which projected forward and hindered respiration. Within a few days after operation, the thyroid steadily diminished in size and became and remains normal.

For the past three years, the writer of this editorial has based his clinical care of five patients, four female, one male, all youthful, each presenting the triad symptoms of Basedow's Disease, upon the removal of markedly diseased tonsils and from these making an autogenous vaccine and with such injecting the patient. The result has been rapid disappearance of all exophthalmic goitre symptoms.

These points, though briefly given, should lead to hesitancy in suggesting surgical intervention upon the thyroid itself until all sources of chronic infection have been eliminated, and from such an autogenous vaccine created and tried.

It is the writer's belief that but a few years will pass until exophthalmic goitre will seldom be directly operated upon.

—*Hugh Crouse.*

OUR MEDICO-MILITARY RESPONSIBILITY.

BY

GEO. F. KEENAN, Capt. M. C., Mass. N. G.

(Read before the El Paso County, Texas, Medical Society, Sept. 4, 1916.)

Brother members of a noble profession: In accepting the invitation to speak here this evening, I have done so with a full realization of my incapability to present so momentous a subject to you in a manner convincing enough, for you to carry away the realization, that sooner or later you must take an active participation in the solution of this important question.

For many months past we have had continually before our minds the question of preparedness. In practically every city of the Union demonstrations by the citizens have shown an awakening to the necessity of some action in order that this great nation shall be adequately prepared to defend itself under any condition that might arise. All classes of men have become imbued more or less sporadically with the desire to take some part in the movement. Business men's classes, Plattsburg excursions, any method that involved the least sacrifice and the least inconvenience.

Members of the medical profession dropped in at the armories, looked us over, and went away wondering why it was that men of our supposed sense would devote so much time and energy to a subject so foreign to our profession.

A slight increase was noted in the men who applied for commissions in the Medical Reserve Corps (inactive list.) At the annual meeting of the Massachusetts Medical Society in June of this year, special arrangements were made for the inspection of Ambulance Companies and Field Hospitals, and though the officers and men were at the armory from 11:00 a. m. to 5:00 p. m., a five minute car ride from the official headquarters, only three of the several thousand members of the society presented themselves to see what we had to demonstrate.

A burst of interest from medical sources was in evidence a few months ago, when the presidents of the American Medical Association, the American Surgical Association, The Congress of American Physicians and Surgeons of North America, and the American College of Surgeons, appointed a Central Committee comprised of practically every famous practitioner in the country at the time. In a letter to the President of the United States, dated April 27, 1916, the following extract is found: "We, the undersigned, acting as a committee on behalf of four national societies representing an aggregate membership of 90,000 medical men, have the honor respectfully to present our greeting, and to tender to the Federal Government our services toward the welfare of the Army and Navy."

Sub-committees were appointed from every State in the Union, totalling three hundred and ninety-eight men. I have been able to verify the presence along the border with the troops, of only three of these men with either the National Guard or Medical Reserve Corps, ordered to active service with the regular Army, and not a single man from my own State of Massachusetts.

The deficiency of medical officers in the regular Army is appalling, and the same condition exists in the National Guard.

Our supply of medical officers at the present consists of the Regular Army Medical Corps, The Medical Reserve Corps, and The Medical Corps of the National Guard. The first group is shorthanded, lacking by several hundred the number necessary to organization, so that practically every unit of the service today has not its necessary quota of medical officers. The Medical Reserve Corps, untrained and not over enthusiastic about being trained, has certainly not covered itself with glory in the present mobilization.

A large percentage of its members are men of eminent standing in their communities, past military age, and with absolutely no intent of entering service unless in command of some large hospital taken over as a Base Hospital by the government during actual warfare.

The younger members of the Reserve Corps, dismayed at the possibility of being ordered to active service and the necessity thereby of leaving lucrative practices and home comforts, have amply demonstrated the success of concerted "wire pulling." The lists of resignations of members of the Medical Reserve Corps, appearing in the daily papers, certainly does not reflect credit upon them as a body or as individuals.

In the National Guard we have not a great deal to boast of in our medical officers, in their tendency to stick by their guns, for the resignations from the Medical Corps far outnumber all other branches of the service, though it is with pride that I state that every one of the thirty-five medical officers accompanying Massachusetts troops to the border is still at his post, although being the first troops here, we had but a very short time to arrange our professional and domestic affairs.

In the *Military Surgeon* of February, 1916, an article appeared on the preparedness of the Medical Department of the United States Army for war. It was stated that every unit was assembled ready for shipment, the only requisite necessary to set the machine in motion being a telegram as soon as mobilization occurred. Of the smaller units prepared were the supplies for recruiting stations and although we were mobilized on the morning of June 20, 1916, and were in camp until June 26, 1916, when orders to move to the border were received, not only were the recruiting units lacking, but even the blanks for physical examinations were not obtainable, seven days after the President's call, and even the stethoscopes used in examining the men were the personal property of the medical officer using them.

Hess in his report of April 16, 1916, reports the deficiency in the National Guard of twenty-eight Field Hospitals, and thirty-eight Ambulance Companies, the more difficult and larger of the sanitary units to maintain, and this deficiency applies only for a National Guard of 125,000. The Fifteenth Militia Division, comprising your own State of Texas, Oklahoma and New Mexico, is short, and must supply three Field Hospitals and four Ambulance Companies, no little undertaking. Furthermore, I have not been able to learn of any completely equipped unit of the medical department on the border today, although some have been here nearly ten weeks.

Insistence on maintaining mule drawn ambulance companies is another instance of lack of progressiveness in the Medical Department. Older army officers still hold to the infallibility of the army mule and its ability to go where the motor cannot; but I am positive in my assertion that a motor ambulance company can in one-third the time transport equal numbers of sick and wounded and present at the termination of its work the same percentage of workable transportation as a mule drawn company.

We face a serious situation, an ease loving people, self pampered and prosperous. We possess the universal short sightedness of Americans as to the dangerous possibility of conquest by invading powers and the consequent destruction of property; the violation of our wives and daughters, the leveling of our institutions, the conditions of bondage, and the subsequent payments of large indemnities on demand of a victorious foe.

It is futile to attempt the creation of a large professional army, for deep seated in our make up is the aversion to the establishment of a large and exclusive military body savoring of caste; this aversion is to be increased by the present European war through the influence of direct and indirect participants. The slogan of a "million men between sunrise and sunset" has been shattered to bits by the lessons of the present mobilization; also gone is the day when we can spring afield armed with the historic pitchfork, for pitchforks cannot combat shells thrown from points eight to twelve miles away, of which we have not the equal. The divergent location and interests of different sections of the country have worked in the past against the development of adequate land and naval forces. The central sections of our country cannot see the necessity of large fleets and in their false security have opposed their development. It is admitted that as a second line behind the fleets must stand a large and well trained and equipped land force. The same forces opposing the developing of these two great units, have also interfered with the interior management of the Army and Navy, so that today they are not qualified to expediently handle a critical situation.

Be not misled by the fact that new regiments are being formed in your midst, for while you may now speak of four regiments where formerly you spoke of but two, remember that your four regiments are at half

strength, where formerly two complete units existed, and that considerable time is necessary to recruit and to train them to efficient organizations.

The obtaining of medical officers for field service is a problem which must be faced without flinching and without reserve. In Germany the most eminent teachers, many of whom we have met, have given up their lives on the battlefields of Europe, side by side with the medico fresh from school. No distinction was made when their call came and they fell into line as designated for the welfare of their country. England, France, and the others followed suit. The number of medical officers necessary for efficient service in the field is conceded to be ten to every one thousand troops. When you consider that we cannot supply the present ratio of three per thousand to the pitiable small number of available troops today, it may stimulate the thought centres, realizing the enormous armies that must be put into the field for defense of this country, remembering that the casualty list of medical officers equal and often surpass those of the line.

In securing officers professionally qualified for the National Guard great difficulty is encountered. Many men who are willing to be known as medical officers of the "Guard" and do not show themselves averse to appearing in uniform at social functions, are active only in movements that do not interfere with their private affairs. The regimental assignments are comparatively easy to fill compared with those to ambulance companies and field hospitals. The enormous amount of work necessary to develop and maintain one of these units does not appeal to the average physician.

The giving up of his spare time and money as represented by three nights, and an afternoon weekly, besides the time called for in his service schools does not strike him as good medicine, with the result that his resignation is soon tendered. Absence from routine sessions soon reduces his value to his organization and his commanding officer is glad to see him go.

Accustomed to being his own boss with an income far in excess of what the military can possibly offer him, used to luxuries as we all are, it is not to be wondered at, that the average doctor finds himself unable to adapt himself to the discipline and rigors of field service except in rare cases. Orders taken from a superior younger and perhaps less prosperous, gall the newcomer; the early reveille, cold water shaving and bathing, coarse food, wholesome and well cooked, yet not daintily served, the absence of the morning newspaper, ants, flies, toads, tarantulas, and occasionally a rattler for bedfellows, do not tend to convince him that patriotism requires such a transition from comfortable home, family and good income, with the result that he is done with the soldier game. Dirt, sand, and a good sweat, combined with saddle sores, prove to him that the most prudent policy is to let the other fellow do it. Gentlemen, twenty years of service on land and sea, in the war with Spain, in strike, riot, and extensive conflagration, have made me wonder if the red blood of America was turning pale.

The scoffings at, and ridicule of sincere men in Massachusetts, by selfish individuals, have many times embittered me in my military efforts, especially when I so well remember when the war with Spain was imminent eighteen years ago, the frantic demands of these same parties for naval protection, and the alacrity with which they removed their worldly goods and cash to points forty miles inland from Boston.

The one solution, medical men of El Paso County, is apparent, that is, universal and compulsory military service for all men, of all classes, of military age, without fee or favor. Our voluntary system of service is a farcical failure and has always so shown itself when the exigency presented. Income, home affairs, and personal ambition must be set aside for the national welfare, and it is among you and your successors that the sacrifice must be made.

There are two methods of raising armies—one by voluntary enlistment, the other by universal training and service. The voluntary system is enormously costly both in men and money, and is attended with innumerable evils. It is a simple matter to get men to offer their services during the excitement of the outbreak of war, but this enthusiasm soon subsides, and then it becomes necessary to offer all kinds of inducements. Under the voluntary system the government goes before the people as a suppliant, because it has put a premium on selfishness and shirking instead of treating them all alike. Voluntarism is the most plutocratic military system yet devised.

It is important to remember that compulsory service is the only method yet devised by which a nation can put forth its entire military strength in time of war. Such a system does away with the professional army, which is a thing of the past, and makes every able bodied male prepare to defend his country in time of need. Under this system the army becomes thoroughly democratic and popular and forms one of the national institutions instead of being a thing, a caste, apart from the rest of the people.

A valuable effect of military training is that it awakens in the hearts of all who participate in it an appreciation of their obligation to the nation in war as well as in peace. It tends to improve their physical condition, their economical efficiency, to instill habits of regularity, thoroughness and promptness. It goes to make all around better citizens, and when men are thrown together, shoulder to shoulder doing the same thing, living under the same conditions, actuated by a common impulse— and that purposes the better to prepare themselves to discharge their duties under all conditions, whether of peace or war—you have one of the strongest influences of a national solidarity.

At this time, when most clear-headed men, both in civil and military life, recognize the fact that the question of obligatory military training seems to admit of only one rational solution, is it not in order to ask: Why should doctors be exempt from the same service to the state? We believe that our profession in its affirmative answer would not hesitate for a

moment. In any humanitarian or other cause in the relief of suffering, doctors as a class are self-sacrificing beyond all others; they are foremost in civic patriotism with an esprit de corps which needs only to be directed into proper channels.

In all our wars civilian surgeons have been prompt to offer their services and to make any sacrifices, but unfortunately, they are slow to recognize their limitations.

It is difficult for the most eminent and accomplished practitioner to understand the difference from a military standpoint between a surgeon in civil life who is an operator, and a surgeon in military life who must be an organizer as well as an operator.

The civilian doctor needs to be trained, like the fighting man, to think along the military lines. He is not readily amenable to discipline and is impatient of "paper work." Things that are known to be of vital importance to the army surgeon he is apt to regard as unimportant. While patriotic and trained to place duty before convenience, unless he really likes them, the maneuver camp and medico-military problem seem to him irksome, it looks too much like playing soldier.

Even in the Medical Reserve Corps, which ought to set an example, as yet only about one-third of the members can lay any claim to even superficial training. We have heard the former Chief of Staff's opinion that "our voluntary system has always been rotten," and we must confess that the part our profession has played has not had a sweet savor in the past.

The remedy is simple. If a physician is indifferent with regard to his duty to the nation which protects him, make him alive to it. In short, we must have the same system which prevails in all the armies of the European continent, the value of which has been so clearly demonstrated in the past year and a half.

Let us begin now by impressing on the entire profession the importance of their duty to fit themselves in time of peace for active service, not to look forward in quiescence and inactivity to political appointments and positions for which they are absolutely unfitted, no matter how capable they may be in functions relating to civil life. A willingness to occupy official place among the defenders of country carries with it an obligation to prepare, so as to carry on effectively the technical duties necessarily pertaining to such place. The best and highest patriotism expresses itself in that inconspicuous service in advance towards preparedness which alone ensures success.

Merely to volunteer in time of war may only be a reflection of national fear and hysteria. Untrained, though willing workers, will paralyze where they hoped to quicken. Successful war in modern days is waged by human machines, not by aggregations of human units not fitted to the general plan. The greater the army needed, the greater will be the need of medical co-ordination and the greater the difficulty of accomplishment. We ought to have ready not two, but a dozen thousand medical men, who when they

don the khaki can adapt themselves quickly and easily and effectively to their new sphere of action, because before the need came they had learned what to do. This is "Not a theory, but a condition." Abroad the doctors were ready. They had mobilized with marvelous rapidity, passing from the laboratory and lecture room to the stern duties of war without an hour's delay.

Can we do the same?

The foregoing is indeed a rather sad commentary on the degree of our medical unpreparedness. Lessons dearly bought by grief and suffering are ignored and forgotten, by a careless, forgetful, egotistical, over prosperous public. We must realize that adequate medical preparedness to care for the nation's defenders by land and sea will come only through pressure of public sentiment, it is equally and obviously sure that such public sentiment will not be developed unless by a medical profession, clear of vision, jealous of repute, willing to deprive itself of luxuries and home comforts, and its action marked by immovable decision.

Gentlemen, you are citizens of the United States with all that sacred obligation implies. What consideration is it to get from you?

THE INFECTIOUSNESS OF TUBERCULOSIS.

BY

GERALD B. WEBB, M. D., Colorado Springs, Colo.

(Read at Albuquerque Sectional Conference on Tuberculosis, in Joint Session with the New Mexico Medical Society, Albuquerque, New Mexico, October 12, 1916.)

Regarding mankind it may be at once stated that human beings can no more escape tubercle infection than they can escape measles, and both diseases are infectious as a rule only in childhood. Given the opportunity of exposure, infection is almost bound to follow.

For some diseases there would seem to be a natural immunity possessed by a fair percentage of people. For instance, it is computed that nearly seventy per cent. of children have a natural immunity against diphtheria. The experiences in the recent epidemic in the Eastern states in infantile paralysis suggests that a similar percentage of children may have natural immunity to this disease and so do not become victims.

With measles and with tuberculosis, however, there are probably not two per cent. of children who by their inherent immunity can escape these infections.

In the case of measles the infection leads to the disease, which may be mild or severe. In tubercle infection of children, however, easily recognizable disease does not follow in the large percentage of the infected. It has been abundantly proved by clinical observation and by animal experimentation that the tubercle bacilli may remain practically harmless in the infected host.

Post mortem records and tuberculin tests show that in large cities over ninety per cent. of children are infected with the tubercle bacillus by the age of fifteen.

This infection of children by the tubercle bacillus we now understand as nature's crude method of vaccination against the disease, for we can now assert that through this childhood infection most adults are rendered immune to tuberculosis.

Just as with measles, so again with tuberculosis, the longer a community of people has been in contact with the disease the less the mortality to be found in that community from that disease.

We must remember that in the crude vaccinating process of our children by nature (or civilization), eighty per cent. of the children who by chance become infected before they are one year old will die, while ten to twenty per cent. of those infected after two years of age also are killed.

Tuberculosis of the spine has been observed in Egyptian mummies of

the periods 2,000 and 3,500 B. C. In modern Egypt tuberculosis was unknown. It has reappeared in Egypt and in Palestine within the memory of physicians practicing there. This has been attributed to the introduction of infected Russian pilgrims and to the return of native emigrants from America. It would seem therefore, that these races might have at one time rid themselves of the disease but are now again vulnerable.

In spite of the large amount of research work that has been done on tuberculous infection we are still somewhat in the dark as to how this infection takes place.

It is certain that children can become infected by either the bovine form of tubercle bacillus or by the human variety.

It has been estimated that about eight per cent. of samples of milk from dairies will contain living and virulent bovine tubercle bacilli. Pathologists believe that infection from such sources will lead especially to types of surgical tuberculosis, that is, tuberculosis of bones, joints and lymph nodes. However, all such types of tuberculosis cannot be attributed to the bovine variety of bacillus.

Pathological anatomists find that in ninety-five per cent. of children who have a tuberculous lesion, this lesion will be found in the lungs and bronchial lymph nodes and is then always caused by the human type of bacillus.

Whether this infection reaches the lungs by the respiratory or digestive tract is still disputed, but the general opinion is that direct inhalation of the human type of bacillus produces such infection.

The fact that in probably all other diseases of the chest infection takes place by the respiratory route would seem to add weight to such a conclusion. In tuberculosis of hogs, on the other hand, infection takes place by the digestive route.

To return again to the early infection of children by the tubercle bacillus, the author believes that symptoms resulting from such infection can frequently be present, yet overlooked.

A slight bronchial cough persisting several weeks, lack of gain in weight, nervous manifestations, slight daily rise in temperature, persistent increase in pulse rate, stomach disturbances, and so on, may be signs indicative of infection. These signs, however, usually do not suffice to enable a diagnosis of tubercle activity to be made.

The application of the complement fixation test would promise to reveal infection in these children possibly before the occurrence of tuberculin hypersensitiveness.

The infection of tubercle has been aptly compared to that of syphilis. It is known that a syphilitic person is immune against reinfection from without, but the disease can spread within the body from the early infected lymph nodes and so eventually bring a fatal ending.

It has been said that "only a tuberculous animal is immune to tuberculosis;" just so, only a tubercle infected child is immune to tuberculosis.

The life history of the parasite of tuberculosis demands that there be access to and egress from the host. As we know, many parasites have enlisted the aid of insects to transfer them from one host to another. The tubercle bacillus for its own ends probably taught man to be a "spitting animal."

The human type of bacillus is "tuned" for the lungs, infection by it of other organs of our bodies is probably accidental.

It is difficult to understand the part of the life history of this parasite which requires childhood infection and yet does not bring about the expectoration so necessary for its propagation until adult age of the host is reached.

In pregnant consumptive women we find the tuberculous process often remarkably held in abeyance until after parturition. It may be that a similar hypernutrition of the growing child can hold in abeyance the tubercle bacillus. It certainly seems paradoxical that during the years that most infections take place the death rate from tuberculosis is lowest.

The work of Flugge on droplet infection suggests that the greatest dangers of infection come from tubercle bacilli contained in droplets emanating from spitting, coughing or even talking consumptives. One has only to cough or speak in front of a mirror to see the numerous droplets of moisture collected on the mirror's surface. It has been experimentally proven that such droplets from a consumptive can contain virulent tubercle bacilli, yet the numbers of these bacilli would be very few in comparison with the millions which are to be found in the lumps of sputa. The idea of infection occurring from such droplets would seem to be confirmed by animal experimentation. A dozen bacilli, if virulent enough, can produce infection which would be of a more benign type than that caused by the introduction of millions. Should such large numbers be introduced we would be more apt to expect a rapid disease.

Experiments conducted with dust collected from the houses and rooms occupied by consumptives show that animals cannot as frequently as might be expected, be infected and made tuberculous by injections of such material.

When cattle placed in contact with cows called "reactors"—animals reacting to tuberculin, yet having no open tuberculous disease—can become infected with tuberculosis, it would seem, according to Romer that there may be other modes of infection which are not yet understood. Distaso has recently shown by interesting experiments that guinea pigs can be infected by contact with tuberculous guinea pigs and that the route is probably through the nose.

The usual source of infection in the human race is undoubtedly the consumptive, and Hamburger states that it may only be necessary for a child to come once in contact with a consumptive to become infected.

One of the results of sanatorium treatment for consumption has been to convert patients who would otherwise die of tuberculosis, into chronic

cases or "carriers" of this disease, so we must expect more and more infections in children. There has been also generally a reduction in adults of the morbidity of this disease.

The number of deaths from tuberculosis, which in childhood exceeds those from all the so-called children's diseases, has not appreciably diminished during the last thirty years, according to Bandelier.

The infectiousness of tuberculosis was early suspected. It is narrated that Valsalva and his pupil Morgagni were afraid to dissect the bodies of consumptives. Morgagni in 1760 was one of the first pathologists to describe the little lump or tubercle which characterizes the disease tuberculosis. It was Morgagni, too, who said that observations in disease should be weighed and not counted.

Laennec, the inventor of the stethoscope, thought he had infected himself with tuberculosis when conducting an autopsy on a consumptive.

When visiting the Keats Memorial in Rome some years ago, the author learned that this dying consumptive poet had brought great fear of contagion to the Italians. Food and necessities were delivered to him by the inhabitants through the windows and Keats was subjected to the ostracism which it is to be feared has been recurring in this country in the present generation.

At the end of the eighteenth century it was required in Italy that all the bedding and clothes of consumptives be burned.

The experimental proof of the infectiveness of tuberculosis was first produced in a rabbit by Klencke. Later Villemin, who so recently died, infected animals with sputum and with caseous material.

It is accepted that primary infection takes place easily. Re-infection with tuberculosis is either by the spread of the disease from the infected lymph nodes, called endogenous, or else from new inhalations of bacilli called exogenous.

It is recognized in animal infection that the bacilli of a reinfection may not be destroyed, but may remain latent at the site of inoculation. Hamburger states that exogenous reinfection by inhalation occurs frequently, especially in individuals who are constantly associated with consumptives. He states also that many develop an immunity to exogenous infection, while for many it is very dangerous.

The latter statement would seem to be contrary to the experience of physicians and nurses who have cared for the consumptive sick, for in all countries it has been notorious for years how rarely such an attendant develops the disease.

In lectures I have given nurses over many years, I have always emphasized this point. I have insisted that a person who has, for instance, typhoid fever, cannot then get typhoid from another victim. Similarly, I have pointed out that these nurses have already resisted slight infections and are therefore immune to reinfection.

The campaign against tuberculosis the world over has resulted in the development of an unnecessary fear by adults of the unfortunate consumptive. This fear, termed phthisiophobia, has resulted in almost a persecution and ostracism of the consumptive, similar to that I have referred to regarding poor Keats.

Your distinguished student of tuberculosis, Col. Bushnell of Fort Bayard, has for some years earnestly contended against this attitude. Fishberg in his excellent new book "Pulmonary Tuberculosis," eloquently takes the same stand.

Our renowned President, Dr. E. R. Baldwin, has again and again emphasized the injustice that is being done to the unfortunate victims of pulmonary tuberculosis. It is very necessary that the public be taught that it is almost impossible for this disease to be contracted in adult life from outside infection.

On the other hand it must be emphasized more and more that children must be better protected from the consumptive, especially during the first few years of life.

Examination of school children must also be insisted on so that those children who indicate more tuberculous infection than protection can have their general health improved by better hygiene and more outdoor living.

The world is daily expecting the discovery of a method of vaccination against tuberculosis. It would seem to be necessary in order to produce any immunity to imitate nature and to produce in a child a localized infection from which disease could not proceed. This may yet be possible of achievement, and its discovery will prove one of the greatest triumphs of modern medicine.

In the meantime the death rate from this disease is gradually falling, not so much because of the campaign against it, but because of the more thorough tuberculization of all races.

By creating more carriers of disease there can be little doubt that for the time being we are playing into the hands of the parasite, for the tubercle bacillus desires an increase of colonies and does not desire destruction of the host.

The dangers brought about by the increase of the carriers or of those who can spread infection, will in time be offset by the increase in protection gained by such infection.

To take advantage, in conclusion, of the knowledge we have gained in regard to the infectiousness of tuberculosis, we must demand, (1) that all consumptives should shield their mouths when coughing, especially in the presence of children, and that their expectoration shall be properly destroyed.

(2) That all young children, especially infants, be removed from contact with the spitting consumptive.

(3) That the general public be reassured that there can be no danger to them from ordinary contact with the consumptive.

(4) That school children in all communities should have the services of school physicians whose duty should be to see that children who are below par and who would seem to be candidates for active disease should be cared for and placed in open air pavilions until such dangers are passed. To stamp out consumption in adults we must begin with the child.

(5) That in all cities open air pavilions or so-called preventoriums, such as at present exist in a few, be built, where such children can be properly cared for.

DISCUSSION.

Dr. David C. Twitchell, Albuquerque:—I think that we all feel extremely indebted to Dr. Webb for this very important and interesting paper. He has brought up many points for discussion, many interesting and important points.

There occurs to me an instance, which I saw myself, of native infection, to which the Doctor refers as occurring in Egypt and Assyria in these latter years when there was undoubtedly an early immunity there. In the island of Bermuda, which is only 300 miles from New York City, for many years, up to the last ten years, there was very little tuberculosis among the native population, very little. In fact, they seemed to be quite free from tuberculosis. But in the last ten years it has become more and more popular there with the young negroes to go up to New York City to work in the restaurants and hotels, etc., and many of them contract tuberculosis and then return to Bermuda and spread it among their families, until today in those small islands the tuberculosis problem among the negroes is a very serious one indeed.

But to take up the matter under discussion: I will touch on only one point. I might say, first, that like many other questions in tuberculosis, it would seem surprising that after so many years of very intensive work there are yet so many questions in regard to this serious malady which are yet unsatisfactorily explained. This fundamental question of infection, which certainly is the basis of all our campaign against this disease in the way of prevention, is yet, I daresay, an unsettled question. We have all of us seen the emphasis change from adult infection to infection in infancy and childhood, and this is the present phase of the matter that holds our attention. But I think we all ought to bear closely in mind that this is largely a theoretical consideration, and that the question is not settled. Certainly, we should not relax our efforts at protecting the adult from infection because at present the emphasis is on infant and childhood infection.

It is well to keep in mind the other possibilities in this unsettled question of infection and not become fixed in our minds, especially when we are considering the question of research work. After all the research work and investigation that has been made on this question of infection, I think the outstanding points that are settled upon are the infecting agent, the tubercle bacillus, but as to the manner of infection and channels of infection I feel that the matter is yet very decidedly unsettled.

In conclusion, I would say that from a practical standpoint of our knowledge of the tubercle bacillus as an infecting agent, it would seem to me from my experience in the management of cases and study of the problem that the two practically important things are the extension of the principle of fresh air schools and the care of children, as Dr. Webb has pointed out; and in the second place a more careful campaign, particularly by the practising physicians, of education that would lead to the destruction of the tubercle bacillus in the home, because I believe that tuberculosis is largely a house and home disease and it is only by the education of the consumptive himself or herself that this destruction of the tubercle bacillus in the home can be carried out. Thank you. (Applause.)

Dr. Robert B. Homan, El Paso, Texas:—I have greatly enjoyed Dr. Webb's excellent paper. The Doctor has done quite a deal of original work and an immense amount of study along this line, and any expression from him upon the infectiousness of tuberculosis we should accept largely as authority. That is very little that I could add to it.

Certainly, in the past, we have neglected our work among the children in the prevention of tuberculosis and it devolves upon us, as medical men, in the future to put more time and study upon the methods of work among school children, especially

in the prevention of tuberculosis. Just now many of our states are adopting laws of enforced education, and right here we should put in a word of caution, for forcing children to attend school who are really tuberculous is not desirable, and in states where these laws are proposed, our medical men should see that some method is used for the exemption of children with tuberculosis. They should not be allowed, at least not forced, to go into our public schools.

Now while we recognize the importance of this preventive work among children, I agree with Dr. Twitchell that we must not allow the pendulum to swing too far in one direction. Those of us who are doing tuberculosis work realize the frequency with which we encounter consorts who have undoubtedly contracted tuberculosis from the other member of the family. We also come in contact with adult infection in other ways. For instance, a bank clerk goes to a bank where someone has died of tuberculosis, perhaps using the same books, working with the same things. Soon he contracts tuberculosis. Then it is not long until there is another case from the same institution. We must recognize from these cases that adults do contract, frequently, tuberculosis from each other, and while we appreciate the importance of the work among the children, we must not let it lead us away from the fact that there is still danger of adults contracting the disease from adults. (Applause.)

Dr. J, Metzger, Tucson, Arizona:—All the work that I have been able to do in tuberculosis has been of purely clinical nature, and I therefore do not feel qualified to intelligently discuss a paper of this nature. However, I do enjoy and appreciate the good paper and the excellence of everything coming from Dr. Webb, which I think warranted us in our anticipations of real quality.

My belief is that the theory of childhood infection is much more tenable than the theory of infection by the respiratory tract. The arguments seem to me much more conclusive. The community experiment, now being done by Dr. White, of Pittsburg, about which Dr. Jacobs told me the other day, certainly should throw some light upon this problem of the infectiousness of tuberculosis. Likewise the community experiment which is to be undertaken under the National Association for the Study and Prevention of Tuberculosis, financed by the Metropolitan Life Insurance Company, should throw some light upon the problem. I think the results of these experiments certainly will be looked forward to with a great deal of anticipation.

The essayist referred to a certain hospital in the period before 1882 and the period after that date. I happen to have the figures at my fingers' ends here, and I will give them to you. In 36 years prior to 1882, among 154 medical men who were connected with this hospital, there were 51 per cent. who contracted tuberculosis. After the discovery of the tubercule bacilli, in 27 subsequent years, among 309 people who were connected with the hospital, in other capacities, however, than as physicians, there were 32 per cent. only who contracted the disease. However, it seems to me that if infection by contact does not occupy the place that we have in the past believed it occupies, there is not enough disparity in the figures. I believe the decrease should be much more than 19 per cent. I thank you. (Applause.)

Dr. A. M. Forster, Colorado Springs:—When I was in medical school I remember that whenever the quizzmaster asked us what we would do in a certain case, that if we were puzzled we would say we would let nature take its course; and I think that is a very good principle for us to follow in connection with this tuberculosis problem, if we can find out just what the forces of nature are doing and how she is doing these things, that we may steer our course more clearly.

It is a fact that the death rate from tuberculosis has been dropping in the last generation, very perceptibly dropping, and there has been a campaign against tuberculosis, an organized campaign, for the past fifteen years. Yet up to now there has been no perceptible increase in the dropping of the death rate over that of the fifteen years previous to the beginning of the campaign. If we can find out just what forces have been at work during the past generation and direct those forces along the proper channel, we will then possibly be able to increase the rapidity in the drop of the death rate. Dr. Webb brought out that we probably have increased the number of carriers, probably have increased by the work we have done so far the opportunities for infection, and, also, we have diminished the death rate. So that, as I said before, it seems that there is some force which is working, not against the opportunities for infection, but for decrease in the death rate. That force is probably, as has been pointed out a good many times, the improvement in living conditions.

As Dr. Twitchell says, Dr. Lewis has elaborated an ingenious theory in regard to the drop in immunity along at the time of the greatest incidence, the greatest

death rate from tuberculosis, and yet that may not be a complete explanation. As Dr. Webb says, though the child leads the life of civilized surroundings, yet his opportunities for healthful outdoor life are very much greater than those of the young adult, and I feel very firmly that the death rate along between the ages of twenty and forty is not due so much to any peculiarities with regard to the tubercle bacillus or the conditions of the body as it is to the conditions outside of the patient, outside of the animal, the surrounding conditions, which are so radically changed when he goes into the fight of life, in active competition with his fellow beings and under the most adverse economic conditions. (Applause.)

Dr. J. S. Cipes, Albuquerque:—I fully agree with Dr. Webb's paper or rather with most of his statements, with the exception of one part of his conclusions. He makes one statement there which seems to minimize the danger of infection from adult to adult. At the same time he gave in his paper the method of transmission, the droplet infection. While it is true that at the present time the general opinion seems to be that tuberculosis is caused only in childhood, or, in other words, it is contracted in infancy and childhood, and not in adult life, yet as long as we know there is droplet infection we must realize that there is a possibility of the tubercle bacilli being transmitted to the child even though no adult has been exposed to it, for we know that the tubercle bacillus will live probably for months or years, if it is not exposed to direct sun rays, and in this way infection would naturally be carried to the home. If an adult is exposed to the tubercle bacillus, the droplet will probably be carried to the home on his clothes, and in this way be transmitted to the child. For this reason I believe that we ought to be a little more careful in saying that the consumptive is not dangerous to the adult, for in this manner he can infect the child, even though it is not direct contact. (Applause.)

Dr. A. W. Wilson, Prescott, Arizona:—Dr. Webb's paper has a very close bearing upon the work of the Society which is in session at this place. The whole problem of tuberculosis depends entirely, in my opinion, upon the amount of natural immunity that is developed in the individual. This immunity is, I believe, acquired, as Dr. Webb stated, by nature's vaccination. One means by which we can assist nature is by trying to prevent a massive, overpowering vaccination in childhood, and by aiding the child to acquire the proper vaccination by carrying him through those periods of stress in childhood. There is no one thing that could be more deplorable than to absolutely stamp out the natural means of vaccination in childhood. If we had at the present time an immune, free race, with a certain number of tuberculosis carriers, we would have a type of tuberculosis which would closely resemble tuberculosis in the Indian. Protect the child from massive infection, and carry him through the periods of stress by our outdoor schools and a rational outdoor life. (Applause.)

Dr. L. S. Peters, Albuquerque:—I do not feel that we ought to close this discussion without hearing from Colonel Bushnell, who probably was the first man in America to do anything definite along this line. (Applause.)

Col. Geo. Bushnell, M. D., Fort Bayard, N. M.:—I am afraid that my close proximity to Dr. Peters might lead you to think that I had something to do with this request. I have not prepared any remarks at all, and as the time is rather short, inasmuch as we were late in starting, I will speak of just one or two items that occurred to me in connection with the remarks of some of the speakers.

One of the speakers, during an argument as to the danger of reinfection, has quoted the fact that cattle do not continue to retain their immunity any longer than the bacillus lives. I do not think that we ought to draw any conclusion from that, because cattle are vaccinated with the human strain. Now how can you tell for sure whether you have bovine tuberculosis or human tuberculosis? What you do is to get a cough, and when the cough is over the effect is ended. In other words, the human strain has very little pathogenicity to cattle. It is very slightly pathogenic, or perhaps not at all in some cases. Therefore, in accordance with the general law that we do not get immunity except from a virulent organism, we cannot expect to get prolonged immunity in cattle to human bacilli.

The question as to reinfection I think is the most important question before the medical world today, barring none; for the reason that the question is at the bottom of so much legislation, so much talk of sanitation. We are either right or wrong in our theories of infection, our fears for the adult. If we are wrong, we are doing a great harm; if we are right, we are not doing very much good, because, as has been stated, the morbidity of tuberculosis is not diminished. The mortality

of tuberculosis has diminished in the last fifteen years, but not the morbidity. There are just as many people who have it as ever; the reason they do not die is on account of the hygienic conditions, not on account of specific treatment or specific sanitation.

The infection of adults is stated, and was stated by one of the speakers, to be proven by such illustrations as the bank clerk who gets tuberculosis because his predecessor had it, or the wife who takes it because her husband had it. Now that does not follow at all. All children have tuberculous infection. Suppose we take that as an assumption, that all children have tuberculous infection and cannot get any more. Then if they get sick of tuberculosis later the reason is that they have lowered their resistance to their own organism. Now people under the same conditions of sanitation are very apt to develop similar diseases, and a dozen people under unhygienic conditions will be very apt to develop tuberculosis one after the other on account of the unhygienic conditions and not on account of infection from one to the other. I think it can also be stated as a pathologic fact that can hardly be disputed that no infection that can be traced in point of time from one person to another will result in chronic pulmonary tuberculosis. I had a case once where a man came in—he happened to be a marine of the Navy—to Fort Bayard with a diagnosis of tuberculosis contracted not in the line of duty. Why not, why not in the line of duty? It was so stated because this man had gone on a three days' hike, and while on the hike he developed a hemoptysis. Therefore, he got his tuberculosis on that three days' hike and not in the line of duty. That is a good example of the infection of tuberculosis in the adult. (Applause.)

Dr. A. H. Williams, Phoenix, Arizona:—I think that the danger in Dr. Bushnell's argument is that what he says about the communicability of the disease in the infection of adults not being proven is equally true in regard to Dr. Webb's statement that only children can be infected; and if we are going to err on any side, we should err on the side of regarding tuberculosis as possibly infectious to adults. For that reason it seems to me that Dr. Webb, with his great authority, just as Dr. Baldwin of Saranac, with his authority, are really dangerous to our community today, because they state what is after all only a theory so positively.

To my mind we ought still to regard this question as an open question. When we consider the enormous statistics that were compiled a while ago on house infection—and we cannot throw them away, because we accepted them once, though we have forgotten them—when we consider that after all it is true that an apparently larger proportion of husbands and wives than the hygienic conditions would seem to warrant contract the disease, when you consider that at the Johns Hopkins school it was found that the increase of tuberculosis among their medical students was so severe that they have been obliged to force them to a more hygienic manner of life, requiring them to rest on Saturdays and to take other precautions, when you go back and consider the enormous number of mistakes that Medicine has made, when you consider that men like Koch have had to revise their ideas of tuberculosis; when you consider these things it is impossible to feel that we can accept unreservedly the theory of infection only in childhood. By Dr. Webb's own figures, ten per cent. of the adult population is not immune, because he says that only about ninety per cent. of children are infected; and we have no business to expose that ten per cent. of the adults to infection. (Applause.)

Dr. Webb, closing:—It was very kind of you to take so much interest in my efforts, and I greatly appreciate it.

I think perhaps I had better reply to Dr. Williams first, inasmuch as I am labeled as a dangerous animal. Of course, no one realizes more than I do that fashions change in our views of diseases and in tuberculosis very much like the fashions of ladies' clothes and dress, and that we may think one thing one year and another thing another year; but the conclusions that we have come to are not only warranted by the figures, especially the exact figures which Dr. Metzger gave from the hospital, which are very remarkable when you think of it, because before the period when the tubercle bacillus was discovered in eighty-odd, they never used to open the windows. I was brought up in a London hospital, I was brought up with consumptives as a medical student in a London hospital, and I know they never opened the windows there. I was put in the hospital once because they thought I had it. We never had any open windows and there was no other attempt to give the proper hygienic treatment that we give today, and they were in absolute ignorance as to the bacillus and its behavior. So the figures quoted by Dr. Metzger are really very remarkable when you think of it—practically no difference in the number affected in the days before the discovery of the germ, when there was no knowledge of hygiene and no knowl-

edge of the infectiousness of the sputum, and now when every precaution is taken.

Also it has been shown in animal experiments—experiments on sheep, and sheep are more like human beings than other animals—that it is not possible to reinfect sheep with ordinary doses. On the other hand, it is known that if you give a sheep a massive infection then you may produce disease. It is very similar to what we find in smallpox. The disease is not produced by ordinary doses; but if you inject a tube of smallpox virus into the veins of an adult or a child who has been vaccinated, I doubt if he would be more immune. I mean immune in the ordinary sense, that is, from the actual contact and the ordinary chance of infection. I rather think that the figures will bear out the point that Colonel Bushnell and Dr. Baldwin have so well taken.

In regard to the experiments that Dr. Twitchell spoke of as having been made by Paul Lewis, he was one of the pathologists of whom I spoke who disagree with the present conception. I rather agree with Colonel Bushnell that you cannot compare the bovine conditions with the human conditions. Of course, Paul Lewis and Theobald Smith have used the bovine vaccination with the human strain and have followed it up then with the bovine strain. In spite of that, I do not think you can compare them, because I do not think that Dr. Lewis makes it absolutely certain that the germs of childhood have absolutely disappeared. It is known that they may not be absolutely disappeared. He would first have to prove that every infection of childhood is absolutely overcome, that the child is no more sensitive to tuberculin, which we know is not the case. So the child in all probability has these germs for many years. There, too, clinical experience disagrees with Dr. Lewis. We can watch these children with tuberculosis, we have the opportunities in tuberculous families now with our improved methods of X-ray work to watch these children through their lives and we can see more or less the conditions that are going on within the child. So I do not feel that we can really accept Dr. Lewis' conclusions.

In regard to what Dr. Homan has said, I also agree with Colonel Bushnell that there is such a thing as coincidence, and when you speak of the case of the bank clerks coming down, two or three of them from one bank, it is also perfectly true, as Dr. Bushnell says, that under the same conditions similar results will be obtained. There are experiences, too, which lead us to think that there are instances when human beings can be overcome by an overwhelming infection. Then there is the story of an old gentleman who came to his physician and said, "Here, Doc., if this infection is catching, how is it I have not got it from my three wives?" It seems that he had had one wife after another die of tuberculosis. It may be that that gentleman is really a tuberculous Bluebeard and had been the cause of the death of those wives. On the other hand, most of the infections we see under marital conditions are very benign. We must not overlook the change that takes place when men leave college; they give up most or all of their athletics and go into sedentary life, and it is at that time that we get most of the cases of infection.

Dr. Cipes brought up the very important point of the possibility of contact infection from adult to child. I think it is very dangerous, that the consumptive will at times have tubercle bacilli on his hands, and I do not doubt that it can at times get to the child in that way, even though there is no direct contact.

In conclusion, I have attended medical meetings in many parts of the world, but I do not know that I have ever attended a meeting in such a well ventilated room or with so much good fresh air to breathe.

Dr. W. T. Brown, Watrous, N. M.:—Although the discussion is closed, there is one instance that I would like to be allowed to bring up. One of the large employers of Chicago, employing over 10,000 people, when they took up this tuberculosis problem some five or six years ago, found that in their packing rooms they had a great many cases of tuberculosis. I think they discovered inside of a year something like 30 or 35 cases. They started an investigation into the cause and they rather attributed it to the fact that they were collecting from all over the house the waste paper and that, without being sterilized at all, was simply shredded and used as packing material. They cut out the use of that old refuse paper and for several years have used a first-class quality of clean excelsior and there are now practically no cases of tuberculosis in their packing rooms. The men in those packing rooms were all adults. The conditions of the packing rooms are exactly what they were five years ago, there is no better ventilation or anything else. Now would you think that those people were infected or were they not? They have eliminated tuberculosis in their packing rooms, whereas it was rampant five years ago.

Dr. Webb (in answer to Dr. Brown):—I would not quite know how to answer that, unless it was a coincidence, or it is possible that in using that paper there was a great deal of dust, which might not be so much in evidence with the excelsior. I understand this paper was shredded, so that it might give out a great deal of dust and that dust be conveyed to the lungs. That is possible. I have always had the feeling that in the invasion of tuberculosis there might be some forerunner of it, some irritant, an attack of bronchitis, etc., which might open the way.

Dr. W. T. Brown, Watrous, N. M:.—If I might mention another case, in a machine shop there was a man at a machine who was in an advanced stage of tuberculosis, worked there in that condition for a long time. He died, and another man was put at that machine and he died of tuberculosis. I think it was something like five men who contracted tuberculosis, and all having worked at this machine. Disinfecting was tried, and finally they tore up the entire floor around that machine and put in a new one, and got rid of the trouble. Those are specific instances.

Col. Geo. Bushnell, M. D., Fort Bayard, N. M.:—It seems to me that you cannot draw general conclusions from a few cases of that sort. You have not excluded coincidence, perhaps improved methods of sanitation and hygiene and examination. There are a thousand and one things which might explain that coincidence besides the admission of direct contagion from one to another.

Before we go on with the subject, I would like to express the great pleasure that I have in finding here so many people holding what I consider sane views.

HELIOTHERAPY IN THE TREATMENT OF TUBERCULOSIS.

BY

A. G. SHORTLE, M. D., Albuquerque, N. M.

It was with considerable hesitation that I selected the subject of my talk today, for not only has my experience been short and the number of cases small, but owing to the fact that the treatment has been used almost exclusively in the surgical types of tuberculosis it would be more appropriate for some of my surgeon hearers to discuss this most important treatment.

The best excuse for my assuming to speak on the subject is first, the fact that, short as is my experience, I appear to have been among the first in America to have used solarization in the treatment of tuberculosis. Secondly, I feel that it is time that the treatment of the pulmonary case received more consideration, and with that type I can lay claim to a fair amount of experience.

I shall devote most of my time to a short resume of the literature which is already quite extensive, there having been published about 300 articles on the subject, chiefly by European authors, there being scarcely over a half dozen American contributions. One is impressed by a study of both the American and European articles by the fact that very little scientific work has been done to determine how the beneficial results of the solarization is brought about, in other words the method is still used empirically.

Historical.

Like so many therapeutic methods that come to us labeled "new," heliotherapy proves on investigation to be decidedly ancient. A Frenchman with a liking for puns has remarked that it is as old as the sun. Herodotus is said to have described it as early as 450 B. C., and the Romans built solaria on their houses for this purpose. According to Jeanneret, Faure used the sun cure in 1774 and reported some cures. Cousin in 1815 published a work on the subject and Bonnet in 1845 recommended the treatment in tuberculous tumors of the knee. To Rollier of Leysen, however, must be given the credit of first systematizing the treatment and through the publication of his results to a large extent popularizing it. He started with one small building in 1903, and now has accommodation for 700 patients, which in itself speaks for success of the method.

In America Dr. Holden of Denver used the treatment for a short time but abandoned it, his cases being almost exclusively pulmonary tuberculosis. I started to use the method in Albuquerque early in 1912, and

as far as I can learn the sun bath I built in March of that year was the first built in America for the treatment of tuberculous cases.

Theory of Effects Produced.

I have stated that the treatment so far has little but an empirical basis, but briefly as possible I will review some of the theories advanced to explain the effects produced by the sun's rays on the human body. A brief review of some of the physical facts governing light emanations should probably preface this. As you all know, what we term color is the effect of light rays of different lengths upon the retina of our eyes. When the sun's ray is dispersed through the spectrum into red, orange, yellow, green, blue, indigo and violet, the red will be found to have the longest ray, the violet the shortest. All light rays have three properties, that of heat production, light production and chemical action, these properties varying with the color, red producing the most heat, yellow the most light, and violet or actinic ray having chiefly a chemical action. Besides these visible rays there are the ultra red and ultra violet rays of the invisible spectrum occurring at each end of the visible spectrum. As a sun ray is practically a bundle of these diverse rays the study of its effects on the body becomes most complex. There is not only the varying action as to heat, light and chemical action, but the factor of penetration, for the different rays vary in their power to penetrate the tissues, the heat wave having the greatest penetration, the violet wave the least.

Finsen attributes the effects of heliotherapy to two causes. (1st.) To the penetration of the ultra violet ray with its power to destroy germs. (2nd.) To the influence of the heat rays which act by producing hyperemia and its accompanying phagocytosis.

Delachaux says: "On the circulatory system the sun acts by vasodilation and regulization of the peripheral circulation."

Rollier states that: "Solar radiation augments the capillary pressure and diminishes the arterial pressure and decongests the internal organs," and according to Dietrich the results of exposing the body for a time to the sun's rays that we can consider as established are: (1st) increased pigmentation, (2nd) increased growth of hair, (3rd) increased metabolism, (4th) increase in number of erythrocytes, (5th) local hyperemia, (6th) decrease in number of respirations, (7th) increase in depth of respirations, (8th) fall of blood pressure and (9th) stimulation of nervous system. However, there appears to be much uncertainty and difference of opinion as to the theory of the action of sunlight, and as Mayet has said, "We still lack the sure experiences of the laboratory; animal experimentation is needed."

The ability of the blood to absorb light energy as proved by Von Schlaffer is no doubt a factor in the results, and as a sun bath means, as a rule, an air bath also, it is probable that rapid evaporation of the per-

spiration and better "skin breathing" resulting from exposure to the air alone is not without its effect.

Hallopeau in speaking of the effect on the blood says, "There is an increase in the red globules and in the amount of hemoglobin," but as this is a well known effect of altitude, irrespective of the effects of the sun, the statement does not mean much, in fact, he could have added that there is also an increase in the total count of the whites and an increase in the differential of the lymphocytes, also effects of high altitude.

Results.

Whatever causes underlie the treatment, it is certain that there is a distinct value in the treatment. Surgeons are constantly visiting Rollier, going in the most skeptical mood and departing enthusiastic advocates of the treatment. When such surgeons as De Quervain, Wittek, Bardenheuer and Leriche, advocates of the surgical procedures, are converted to the medical treatment of surgical cases, it is pretty certain that they do not change their views without thorough investigation. It would be tiresome to read the many enthusiastic published reports.

Besides the surgeons just mentioned, Delachaux, Jeanneret, A. Treves, Vignard, Jouffray, Minnells, Kisch and Gratz, Poncet, A. Hussy, Felten and Slottenzenberg, and many others in Europe advocate the treatment In America the surgeons have scarcely tried the treatment, but Pryor, Hammond, Kime and Campbell have treated a considerable number of cases and report good results so far.

This paper, when published, will include the translation of a statistical chart of Rollier's reporting on 1129 cases treated from 1903 to 1913. These include practically every type and form of tuberculosis.

While a careful analysis of the chart will be left for you to make from the published article, it can be said that roughly he got cures in more that 80% of the closed cases and over 70 % of the open cases, and that 308 of the 371 cured joint cases showed good motion on recovery.

Poncet and Leriche have reported excellent results with heliotherapy in the treatment of the surgical type of tuberculosis, but emphasize that it is of great value in many other conditions such as rebellious ulcers, infected wounds, retardation of reunion of fractures, etc. Tuberculous peritonitis and ileocecal tuberculosis usually do well. Rollier reports the disappearance of large tumors of this region reported inoperable by Roux. Considerable exudates will absorb and pain disappear under treatment.

Spondylitis, coxitis and all forms of bone and joint tuberculosis do particularly well. Lymphnodes also disappear under treatment.

Urinary Tract.

To those of us who have treated tuberculosis of the urinary tract and appreciate the difficulties, Rollier's results with 22 cases treated between 1903 and 1916 is most encouraging. He says that in all these cases the condition was due to primary renal conditions. In twelve of these tuber-

culin was associated with the solar cure, six were still under treatment and all are progressing very favorably except one. Sixteen had left the clinic, five arrived there nephrectomized with the operative wounds not healed. Four were completely cured for from three to six months and one case for longer.

Amelioration and cure is shown in this class of cases by decreased frequency of micuration, disappearance of pain, pus, blood and bacilli and improvement in the general conditions. The marked diminution in pain noted would alone justify the use of this treatment.

Pulmonary Cases.

As is usually the case, there is not such concensus of opinion when it comes to the pulmonary case. Rollier says that it has been habitual to decry heliotherapy in the treatment of pulmonary tuberculosis, but that during the nine years of his practice he had had the occasion to observe many pulmonary cases combined with other forms, treated by heliotherapy and he had never a mishap, on the contrary the tuberculous foci were very happily influenced. It is especially children and young pulmonary tuberculous subjects who derive the greatest benefit.

Myers reports an interesting case of hemorrhagic consumption cured by this means and all who have treated pulmonary cases appear to agree that the likelihood of hemorrhage is lessened by the treatment.

Minelle also reported good results in pulmonary cases and gave as contra-indications, fever, hemorrhage, cardiac lesions, nervous dis-equilibrium, chloro-anaemia, tuberculosis. Of the early or symptomatic improvement Felton and Slottenzenberg say: "The healing process in isolated cases is as follows: Great increase in pus secretion for about three weeks, diminished pain after a few days, then adjustment of temperature to normal, a serous secretion which dries up gradually with the healing of the fistulae." The early relief from pain is dwelt on by all observers.

Application of Treatment.

Rollier has given the following directions for the application of the treatment:

"Patients having become acclimated after three to ten days, they are wheeled upon the open gallery where they are directly exposed to the air and sun. Disregarding the location of the disease and whether it be a case of coxitis, spondylitis, arm or foot tuberculosis, the insolation begins always at the lower extremity. On the first day at hourly intervals the feet are exposed three or four times during a period of five minutes.

"The arms are exposed in the same way the next day. The third day the exposed area is enlarged to the inguinal region, the abdomen and breast are included on the fourth and fifth day, at first for only five minutes. All this time the location around the heart is covered with moist packs and the head shaded. The exposures are increased five minutes each day until eventually the patient receives a full sun bath of from three

to five hours daily, and in some cases as much as seven hours. If there is erythema or headache or nervous depression, the duration of exposure is lessened.

Each case of course must be studied individually, and a close watch of pulse and temperature is maintained."

Pigmentation.

Rollier lays great stress on the importance of pigmentation as does everyone conversant with the subject. He claims that blondes who do not pigment readily, especially the red haired blond, will not do so well under the treatment, and he considers the rapidity with which pigmentation takes place an index to the prognosis. Just what role the pigmentation plays is not quite so certain. Some, including Rollier, think that it acts to protect from the short rays, while it admits of the penetration of the long ray. Others ascribe to it a chemical power of in some way converting the short ray into a long one, but whatever the theory, it seems well established that pigmentation is the first important step in the treatment.

The importance of combining the usual methods of maintaining rest of the part is dwelt on by all the writers, or perhaps I should say *unusual methods*, for Rollier refuses to use any cast or brace that cannot be removed daily.

Wignard expresses the idea in a few words when he says: "If the sun is a great healer, it certainly has no orthopedic power. Lesions ought therefore to be immobilized in good positions. The apparatus should have openings sufficient to allow large exposure to solar radiation without the interposition of any dressings."

It is also emphasized that in only exceptional cases should operative procedures be undertaken. Cold abscesses will often absorb, and when they do not they should merely be aspirated and then injected with iodoform emulsion or Murphy's formalin solution in glycerine. Rollier remarks that "to transform a closed tuberculosis into an open one means to increase the gravity of the case a hundred fold."

Rollier also dwells on the bactericidal effects of the sun's rays so that it is applicable to an open sore of any kind. He says: "Heliotherapy realizes all the conditions of an ideal antiseptic; while antiseptics almost always kill the cell before having neutralized the action of the germs, solar radiation by its local and general action exercises its bactericidal power by always safe-guarding the cellular functions. This function is also exerted on the deeper lesions and in the fistulous tracts."

Altitude.

While Felton and Slottenzenberg claim excellent results in cases treated at the seashore, practically everyone writing on the subject appears to be impressed with superior results of the treatment when carried out at a high altitude. This is emphasized not alone by Rollier, but by many treating patients at low altitudes. Bardenheuer who carried out the

treatment at Cologne explains his poorer results as compared to Rollier's by saying, "This is due principally to the fact that treatment was not continued, and also to the fact that heliotherapy was carried on at the 'ground level.'" He claims good results, nevertheless.

Jeanebert, referring to treatment of children at Basle, Switzerland, a place of comparatively low altitude, gives it as his opinion, "That the sun cures tuberculosis on the plain as well as on the mountain, but the treatment on the plain must be twice as long." When it is remembered that one of the dangers of cure of orthopedic cases lies in the depression and mal-nutrition incident to the long stay in bed, or to the immobilization of a limb for a year or more, it is evident that the high altitude presents great advantages.

Jerusalem reports fair results in cases treated at Vienna, but says they are inferior to those obtained in a high altitude.

In America, Campbell at Memphis, Hammond at Providence, R. I., Pryor at Buffalo, N. Y., and Kime at Fort Dodge, Ia., all places of low altitude, claim fair results with the treatment.

Among the theoretical reasons given by Rollier for the better results at high altitudes is the following:

"The opinion of Finsen that the effects of light are confined to the tegumental surface is not true of solar light in high mountainous districts. here it has a much deeper penetrative power. The atmosphere absorbs a considerable part, especially the infra-red and ultra-violet rays. This absorption amounts to 25 to 30% at sea level, but it is only about 6% at the top of Mt. Blanc."

The well known effects of high altitude upon the blood is also no doubt a factor and according to Saake the air of the mountains contain more radio-active emanations than the air at low altitudes.

I have tried to give as concise a statement as possible of the literature and I will now as briefly as possible speak of my own experience with the treatment in the Southwest.

It occurred to me when I first read of Rollier's work that New Mexico and the Southwest in general presented the best climate in the world for the treatment by sun bath.

I spent one winter in Switzerland at Davos Platz and I can safely say that in the amount of sunshine we are as far ahead of Switzerland as that country is superior to the rest of Europe. As to altitude, the lowest point in our state is about the altitude of Leysin. Last month (November, 1916), in New Mexico we had 90% of the possible sunshine without a single day that was cloudy all day. All arguments favoring the altitude resorts of Switzerland apply even more strongly here. The hours of sunlight are longer here and the percentage of sunshine much greater. The treatment can also be taken much more comfortably owing to our freedom from snow, while in Switzerland at 5,000 feet altitude the snow often falls in September and lasts till May.

Altogether, this country presents the ideal climatic conditions for carrying out the treatment, and is superior, not only to the rest of America, but to Switzerland as well.

Report of Cases.

As previously stated, I can report only an extremely small number of surgical cases; this is explained first by the fact that tuberculosis of any kind seldom occurs in this climate, secondly because our sanatorium was built for the treatment of the pulmonary case. I will, however, briefly report a few cases treated during the past five years: C. B., 4 years old, was brought to the sanatorium suffering from tuberculosis of the right hip. There were four discharging sinuses. There had been no attempt at immobilization of the hip or indeed treatment of any kind. He pigmented nicely and in four months returned home with all sinuses healed. One of these re-opened twice, but when last I heard from the boy, all sinuses had been healed for over a year.

Case No. 2: W. F., age 3 years, suffering from closed tuberculosis of left hip as demonstrated by the skiagraph. He was put to bed with an extension apparatus and solarization started. He was in the sanatorium only six weeks, but his mother continued the treatment for six months at their home at an altitude of 6,000 feet. There was complete recovery with good motion.

Case No. 3. G. S., 19 years of age, a most interesting case as combining the pulmonary and surgical types. He had spent six months in a well known Eastern sanatorium, but both hip and lung condition had grown steadily worse, and he was advised to come to me at Albuquerque. He first returned home and there removed the extension apparatus. When he arrived at the Albuquerque sanatorium he had five discharging sinuses from the right hip and his left lung showed moist rales all over the upper lobe. Fever was 102, sputum 2 oz., with many t. b. present. He was averse to using extension again, so was treated without orthopedic apparatus of any kind. At the end of one year all sinuses were healed, and the lung was almost symptom free, there being only a very few rales after cough at the extreme apex. By indiscretions he has lost some of the early improvement in his lungs, but the hip after two years is in good shape, but of course with ankylosis of the joint.

I should add that both Beck's paste and tuberculin were used in both cases No. 1 and No. 3; however, both of these had been used in the treatment of case No. 3 in the East without result.

Case No. 4. Mrs. W., 30 years of age, a third-stage case of tuberculosis of lungs, with trouble on both sides, sputum 3 oz., full of bacilli. Diarrhoea, which I believed to be tuberculous, had lasted, despite all treatment, for over three months. Examination of stools showed considerable mucous and numerous tubercle bacilli. Fever 100 to 101. She had con-

stantly failed in an Eastern institution. Solarization started and after five months the diarrhoea disappeared, and a year later the lung condition allowed her discharge as apparently arrested.

It has been chiefly the pulmonary case that I have treated, and it is in that type of case that I am chiefly interested. It is unfortunate that the value of a given treatment in pulmonary tuberculosis must usually depend upon impressions rather than upon any statistical facts, but this is certainly true except in a few endowed, municipal or governmental institutions, for the simple reason that the patients will not remain through the months or years necessary to cure the third stage case that we in the West usually must deal with. They usually leave an institution when they have secured marked symptomatic improvement.

So I can only speak of my impression of the treatment after using it for almost five years, and the opinion of my co-worker, Dr. Peters.

I have always felt that there was a certain analogy between the use of heliotherapy and treatment by tuberculin. With the latter I have always reasoned that if it can be proved of value in the orthopedic case there must be some value for the treatment if used carefully enough in the pulmonary case.

That in the pulmonary case one must avoid reactions, go slower, take longer time; and so with heliotherapy one must with the pulmonary case avoid too long exposures, watch the temperature and pulse closer than in the surgical types continue the treatment over a longer period and altogether use the treatment much more cautiously than when treating other types of tuberculosis. When this is done, however, I believe there is a distinct value in the treatment.

One must constantly repress over-enthusiasm in the patient and insist that they do not exceed the exposure prescribed, otherwise they are almost sure to take long exposures with the result that they will develop a fever anywhere from 100 to 103, together with increase in sputum, and for several days, at least, will suffer from marked depression.

One good resulting from the firm pigmented skin that I have never seen mentioned, is a comparative freedom from colds. This alone, to my mind, makes the treatment worth while. That many pulmonary cases do make better progress after beginning solarization, however, both Dr. Peters and myself are convinced; indeed, the progress in a few cases has appeared quite remarkable to us.

I will only burden you with one case history of this kind; a Mr. B., age 46, manufacturer, an unusually large man, standing 6 feet 3 inches in his stocking feet. When he came to us from New York, where he had been taking the home treatment, he had moist rales practically over the entire left lung and rales after cough over the right lung from the hilus to base. There were 3 ozs. of sputum daily, loaded with bacilli. He had afternoon fever up to 102 and was suffering from hemorrhages. Under the usual rest cure the fever soon decreased to normal, but without much

improvement in the pulmonary findings. He was started on sun baths and was soon pigmented from head to foot and co-incidently the pulmonary signs began to decrease. At the end of four months there were only a few rales to be heard at the base of the left lung posteriorly after cough. Sputum was negative and small in amount.

Observation of Blood.

During 1914 at the Albuquerque Sanatorium, we began a study of the blood of patients taking the sun cure, Dr. A. A. Duncan, who was then associated with us, doing the major portion of the blood counts.

We found in all cases an increase in the lymphocyte count averaging in thirty cases about 12%. That this increase was relative rather than actual would appear to me proved from the fact that it would drop back to normal by the next morning. It is probable, however, that the patient's hyperemia and lymphocytosis resulted in a condition somewhat similar to that produced locally by Bier's hyperemia treatment. We also found a decrease in the blood pressure at this time, probably due to the dilatation of the superficial blood vessels.

Application of Treatment in the Southwest.

We have found that we must modify greatly the rules laid down by Rollier for the routine treatment.

Our sunlight is so much more intense that exposures must be much shorter than those advised by that author. We begin with fifteen minutes exposure front and the same for the back, but exposing only the feet at first, then each day exposing two or three inches more of the legs and finally the body, taking from two weeks to a month to reach complete exposure of the body. At no time, however, is the head exposed; it must be shaded under an umbrella or other shade. We may then increase the time of exposure up to 30 minutes front and 30 minutes back, but seldom more than that. With the 30 minutes exposure it requires but a few weeks to get marked pigmentation.

A sensation of dizziness or nausea is warning to discontinue tbe bath for that day.

Before closing, I will add that Dr. O. T. Hyde of Albuquerque has secured some remarkable results with solarization, and another fellow-townsman, Dr. D. C. Twitchell, carried out some interesting experiments with guinea pigs which went to prove that the direct rays of the sun on experimental tuberculosis in animals was curative and healing. Dr. LeRoy S. Peters, my associate, combined with me in all cases treated during the last three years.

ROLLER'S STATISTICS OF 1129 CASES 1903-1913

The Heliotherapie of Tuberculosis

1903-1913 IV Statistics 1903-1913

No. of Patients 1129 Adults: 652 Children: 477	Total	Cured	Impr. Stat.	Died		Remarks
Closed cases at arrival	804	703	73	22	6	
Open cases (spontan or post op.)	325	242	39	19	25	
Spondylitis without abscesses	102	90	10	1	1a (a)	Arrived with complete Paraplegia and Cystitis.
Spondylitis with abscesses	68	64	2	1	1b (b)	Arrived with acute Tub. of the lungs.
Spondylitis sec. infection	28	17	6	3	2c (c)	Mult. arrived in extremis.
					d (d)	Arrived with Amyloid.
	198	171	18	5	4	
Tub. of the Pelvis without abscesses	6	6	....	....	....	
Tub. of the Pelvis with abscesses	10	10	....	....	....	
Tub. of the Pelvis sec. infection	21	9	1	6	5	All 5 with Amyloid, 3 had same at arrival.
	37	25	1	6	5	
Coxitis without abscesses	33	76	7	....	....	4 had Amyl. at arrival, 2 Tub. of the lungs, 1 mening. 102 of the 125 cured cases secured functioning of the joints.
Coxitis with abscesses	36	29	5	2	....	
Coxitis sec. infection	39	20	9	3	7	
	158	125	21	5	7	
Gonitis without abscesses	94	85	7	2	....	With Amyloid 1; at the same time Spon. fistulae and Multiple osteites. Of the 106 cured cases 78 secured functioning of the joints.
Gonitis with abscesses	14	12	2	....	....	
Gonitis sec. infection	12	9	1	1	1	
	120	106	10	3	1	
Tub. of the Feet without abscesses	35	33	2	....	....	With abscess of the brain metastat. on account of alveolarer Periostitis, Embolie. All of the 87 cured cases secured functioning of the joints.
Tub. of the Feet with abscesses	17	15	....	1	1	
Tub. of the Feet sec. infection	42	39	2	1	....	
	94	87	4	2	1	
Tub. of the Shoulder without abscesses	3	3	....	....	....	4 of the 8 cured cases secured functioning of the joints.
Tub. of the Shoulder with abscesses	4	3	1	....	....	
Tub. of the Shoulder sec. infection	5	2	3	....	....	
	12	8	4			

Tub. of the Elbow without abscesses	9	8	1	....	....		20 of the 28 cured cases secured functioning of the joints.
Tub. of the Elbow with abscesses	6	6	....	....	....		
Tub. of the Elbow sec. infec.	15	14	1	....	....		
	30	28	2				
Tub. of the Hand without abscesses	8	7	....	....	1a	(a)	Complicated by Tub. of the lungs and Meningitis.
Tub. of the Hand with abscesses	5	5	....	....	....		
Tub. ofthe Hand re-infected	8	5	1	....	1b	(b)	Mult. Tub. and Tub. of the lungs shoed extremis. All 17 cured cases secured functioning of the joints.
	21	17	1	....	2		
Spinae ventosae without abscesses	12	12	....	....	....		
Spinae ventosae with abscesses	3	3	....	....	....		
Spinae ventosae re-infected	17	16	1	....	....		
	32	31	1				
Osteitis clean (closed)	36	32	4	....	....		Mult. Tub. Amyl. 1 Miliartub.
Osteitis secondary infection	49	41	4	2	2		
	85	73	8	2	2		
Peritonitis, closed	57	49	4	3	1a	(a)	With Meningit.
Peritonitis with Fistula post. op.	29	20	3	2	4b	(b)	3 with Tub. intest. ulcer. 1 Amyloid.
	86	69	7	5	5		
Tub. of the Kidneys	31	12	13	6	....		1 with Amyloid, came in cachectic condition.
Tub. wounds after Nephrectomy	20	15	4	....	1		
	51	27	17	6	1		
Tub. of the Epididymis	9	7	2	....	....		
Ileo-cecal	16	10	4	....	2		Both came with Enteritis Tub. ulcer. grav.
Adanexia Tub.	6	5	1	....	....		
Adenitis and Tracheo bronchial-glands without abscess	75	64	4	6	1		1 with Tbc. Pulm.
Adenitis and Tracheo bronchial-glands with abscess	23	23	....	....	....		
Adenitis and Tracheo bronchial-glands secondary infection	38	35	3	....	....		
	136	122	7	6	1		
Polyarthritis. Polyserositis. Poncex Rheumat.	10	9	1	....	....		
Tub. of the Eye	9	9	....	....	....		
Tub. of the Ear	3	3	....	....	....		
Scrofuloderma. Tuberculide. Lupus	16	13	3	....	....		

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THE PHARNYX AS A POINT OF PRIMARY INFECTION IN TUBERCULOSIS.

BY

DR. ROBERT R. BROWNFIELD, Phoenix, Arizona.

(Read at the Seventh Annual Meeting of the Arizona Association for the Study and Prevention of Tuberculosis, Phoenix, April 25, 1916.)

The subject of Tuberculous Infections of or in the Pharnyx is one of especial interest to me by reason of a theory which I have evolved as a result of clinical observations in affections of this nature.

It is my opinion that tubercular infections in the pharnyx occur much more frequently than is commonly believed and that, due to an intimate connection, too frequently ignored, it is a much greater factor in the causation of pulmonary infection than physicians in general realize. Many cases of infection can be arrested by careful and early attention to the pharnyx, which, if neglected, later involves the glands, lungs, meninges or other vital structures. Arnold C. Kleb says: "The lymph nodes are by far the most frequent point of primary T. B. infections." I believe the most frequent sites of invasion of tubercle bacilli in the human subject is that of the lymphatic follicle of the pharyngeal structures, and they frequently propagate in these follicles, from which they find their way through the lymph or blood streams into other less resistant tissue, without ever truly involving the surrounding pharyngeal tissue sufficiently to produce a typical tubercular lesion.

I wish briefly to remind you of the anatomy of the lymphatic vessels of the throat and chest, that you may more readily appreciate the ease with which an infection of one may be communicated to the other.

Without going into the details of the nodes and smaller lymph channels of the throat and head, we will start with the jugular duct which collects the lymph from the head, neck and throat. It descends with the internal jugular vein and after joining on the left side with the thoracic and subclavian ducts, empties into the subclavian vein at the point of junction of this vein with the internal jugular. Through the thoracic duct the lymph channels of the throat are directly connected with the left lung and pleura, the abdominal and pelvic viscera and the lower limbs. Not infrequently the jugular trunk enters the vein independently, thus furnishing a less direct path for infection. The right jugular duct, after joining the right subclavian, and right broncho diastinal, enters the right subclavian vein, thus making a direct connection of the right lung and pleura with the throat. The subclavian and bronchomediastinal on the right side collect

lymph from the right chest wall, the right lung and pleura, the heart and the upper part of the liver. Considering the direct connection of the left lung through the thoracic duct, and the left bronchomediastinal, if all other conditions were equal, this should be the lung most frequently infected, for more than three-fourths of the entire body, including the stomach and intestines are possible avenues of infection, while the right lung has practically no other source of indirect infection than the throat. However, notwithstanding these important facts, there is considerable authority for stating that the right lung, on the contrary, is more frequently the first seat of pulmonary infection. If this is true, the frequent direct entrance of the left jugular lymphatic into the vein, thus shunting the throat drainage away from the left lung, may well suggest the explanation, and should lead to further investigation along these lines, for if this anatomical anomaly of the lymph duct is sufficient to counteract and over balance all other sources of infection to the lungs, it adds greatly to the importance of the throat as a site of entrance for the organism.

Recent investigation has established the fact that infection may follow the lymphatic ducts either in the direction of the lymph flow or opposed to it with apparently equal ease. This has been proven by finding at post-mortems primary tubercular ulcers in the intestine with lymphatic nodes infected both above, in the direction of the lymph flow, and below, opposed to the flow. Further experiments have shown that when a fixed stain, such as india ink is injected into the tonsils, or other pharyngeal tissues of animals, in a comparatively short time the stain is widely diffused throughout the lungs.

Any chronic inflammatory condition of the pharnyx should be seriously considered as affording opportunity for easy entrance and propagation of the tubercle bacilli. It is a well recognized fact that the crypts of the tonsils are frequent points of entrance of the tubercle bacilli, and as a prophylactic measure the tonsils should always be removed if they present a condition of chronic inflammation. On the other hand the posterior pharyngeal wall receives but little attention, even though it is much more richly supplied with lymphatic crypts, which are easily infected but unlike the tonsilar crypts, are not emptied by muscular action involved in deglutiation. The fact that the tissue of the pharnyx exhibits such a remarkable resistance to tubercular infection, and therefore is seldom the seat of an actual tubercular inflammation, may explain to some extent why this point of invasion has been so much neglected.

Enlarged pharyngeal tonsils, commonly designated as adenoid vegetations, are fertile fields for infection. The lingual tonsils are often overlooked entirely, however, they are a very frequent cause of a full, choking sensation in the throat and if enlarged they irritate the epiglottis and cause a constant tickling, dry cough. They may by mechanical irritation actually produce ulceration of the epiglottis. Enlargements of the lin-

gual tonsils are a grave source of danger to the larynx of any tuberculous patient.

The pathological condition, which I consider of most importance, is chronic follicular pharyngitis, or granular pharyngitis, as it is some times called. The primary inflammation and hypertrophy may be due to the action of any or all of the organisms common to respiratory infections, the streptococcus being most commonly the cause. The infection becomes chronic by the retention of the inflammatory exudates and micro-organisms of a preceding acute inflammation and in my opinion it may be secondary to practically any of the acute infections of any part of the respiratory tract. In some cases only one follicle is hypertrophic; in others the posterior pharyngeal wall is thickly dotted with red elevations, each one furnishing a culture tube for development of a colony of tubercle bacilli, whether the bacilli is breathed in with air or taken in with contaminated food.

The Pennsylvania Sanitation Board in the course of experimentations along lines to determine the site of entrance, fed swine virulent tubercle bacilli and found that there was no involvement of the lymphatics of the mesentery, but that the tonsils and other pharyngeal structures were usually involved primarily and the lungs secondarily through the cervical lymphatics.

Monkeys fed on tubercle bacilli died of pulmonary tuberculosis, and post-mortem showed the primary involvement of the nodes of the throat.

My object in presenting this paper is not with a view of attempting to force upon you the belief that every case of tuberculosis is infected through the medium of the throat but rather to attempt to impress upon you the true importance of this avenue.

Every case presenting itself for examination for possible chest trouble should call for a careful and systematic inspection of all mucous surfaces of the nose, pharynx, the faucial, pharyngeal and lingual tonsils and any abnormal condition which these tissues may present, should be given prompt and careful attention.

If this should become a universal practice of physicians I feel secure in asserting that there would be a great decrease in the number of unfortunate sufferers from the dreaded white plague.

The following specimens, reported on by Dr. W. W. Watkins, of the Phoenix Pathological Laboratory are all hypertrophied follicles from the posterior pharyngeal wall.

Phoenix, Arizona, April 22, 1916.

Dr. R. R. Brownfield,
Phoenix, Ariz.

Dear Doctor:

Reporting, partly on the tissue from pharynges.

9542—Dr.:—This consists of lymph tissue, including mucous gland, with the corium and portion of muscularis. The glands seem to be normal,

both in the crypt and in the ramifications of the gland in the corium. There is a distinct area of granuloma in the center of the lymph follicle, bearing the structure of a tubercle.

9768:—Boy:—This shows a typical area of granuloma in the lymphatic tissue.

We did not find tubercle bacilli in section; this is not surprising, because finding the bacilli is a very difficult thing.

Very truly,

W. WARNER WATKINS.

Dr. R. R. Brownfield,
Phoenix, Ariz.
Dear Doctor:

Reporting on the other two tissues from the pharynx. Mr. S. and Mrs. G. both of these show beginning giant cell nodular formation within the masses of lymph cells. These are the appearances upon which we make diagnoses of tuberculosis in lymph glands. The next tissue you remove, send it to us under aseptic conditions, so that we may do animal and cultural work for the tubercle bacilli.

Very sincerely,

W. WARNER WATKINS.

Lab. Reports 10096 and 10144
Dr. Brownfield:

Post-pharyngeal follicle from Mrs. V. S.:—This was macerated in sterile mortar and cultured on Petroff's media and inoculated into guinea pig on May 3rd. No growths appeared on media. Pig was posted on May 22nd. At the site of inoculation on the peritoneal surface there was a small nodule 3 mm. long by 1 1-2 mm. wide. This was taken off, along with the thickness of the muscular wall and sectioned. It shows the typical appearance of tuberculous inflammation. It was submitted to another pathologist with the statement that it was a perotoneal nodule and the diagnosis of lues or tuberculosis promptly made.

Tissue from Miss H:—The same examinations as those detailed above were made. No growths appeared on Petroff's media and no patholigical changes of any kind were found in the guinea pig.

Very truly

W. WARNER WATKINS.

This last case (Miss H.) is one that has been under treatment for some time and was thought by me to be cured, however I took a tissue specimen to check with preceding case (Mrs. V.) which had but little treatment before the specimen was taken. The follicles in Miss H.'s case were originally in a worse condition than were Mrs. V.'s.

BROWNFIELD.

DISCUSSION

Dr. F. D. Wilson:—Dr. Brownfield's paper is of extreme importance to this association. Primarily we are banded together for the prevention of tuberculosis, cure is secondary. The first step in the prevention of tuberculosis is to understand the avenues of infection. It is becoming more and more generally conceded that early tuberculosis is always a lymphatic infection. What we call pulmonary tuberculosis is really a conglomeration of infection; open ulcerative tuberculosis is, to a very large extent, septic infection. If we are going to prevent and stamp out early tuberculosis, we must understand the avenues of infection and appreciate that the majority of these cases are lymphatic infections. Up to the age of 14 or 15 years, some 80 or 95 per cent of children are involved, but this does not mean lung tuberculosis, simply lymphatic tuberculosis. At that stage all cases of tuberculosis are amendable to treatment; there is no reason why any child with bronchial glandular tuberculosis should go on to pulmonary tuberculosis, if he is given a fair chance. As far as the campaign against the spread of tuberculosis is concerned, I have arrived at that point where I feel absolutely sure that we are wasting time treating the advanced case, except in so far as we can isolate him and prevent his being a focus of infection. The only logical way to stamp out tuberculosis is to take the coming generation, appreciate the fact that our tuberculosis is a localized glandular lymphatic infection and work at it from that point. I am sure we all agree with Dr. Brownfield in his statement about the glandular chains in the neck. We all find such glands in our childrens' necks, especially in the posterior chain. The sooner we recognize the fact that these are tuberculous, that an enlarged gland is often tuberculosis, and not wait until the child shows active pulmonary symptoms, the sooner will we arrive at a point where we will stamp out the disease.

Dr. W. W. Watkins, Phoenix, Ariz:—When Dr. Brownfield first mentioned this matter to me and asked my co-operation, I was very skeptical; on slicing the first portion of lymphatic tissue from his cases, I was much surprised to find a well-developed tubercle. This tubercle is located in the center of the mass of lymphatic cells. The other cases examined did not show such a well-developed tubercle, only beginning formations, with giant cells surrounded by a few endothelial cells. In studying up the subject in this connection I learned something which I will offer to correct a very popular misconception regarding the formation of tuberculous tissue. The granulomatous nodule, or tubercle is generally thought to require a considerable period for its formation. Recent work from the Rockefeller institute by means of vital straining after inoculation with tubercle bacilli has thrown a new light on this matter. It has been clearly demonstrated that the tubercle bacilli are ingested within 30 minutes after their entrance into the blood stream, appearing within the mononuclear leucocytes. Within 24 hours giant cells form, and within thirty-six hours complete tubercles appear, giant cells in the center and endothelial cells and round cells arranged in the well known orderly manner outside. So that the appearance of tubercles in the pharyngeal lymphatic tissue or elsewhere does not mean a long standing infection there; the bacilli may have lodged there only 36 or 48 hours previously. Furthermore, it would appear that these tubercles, as is usually thought, are not necessarily permanent structures. Only when the bacilli remain alive and require an armed force to surround them is the tubercle permanent; the microscopic tubercle (giant cell surrounded with endothelial cells) may reach the stage that we found in these tissues, and then disintegrate and allow the bacilli to pass on. We hope to continue these investigations and establish the actual status of the pharynx in the development of glandular tuberculosis.

Dr. R. E. Thomas, Phoenix:—When I saw the title of Dr. Brownfield's paper on the program, I came prepared to have an argument, for I believe that gross tuberculosis of the pharynx is an exceedingly rare condition. In an experience of more than nine years, I have seen a very small number of cases; I can count them on the fingers of one hand. But he has taken the wind out of my sails by changing the title of his paper. I believe that the line of investigation he has begun should be carried out, and I think that Dr. Brownfield and Dr. Watkins together will be able to do some valuable work along this line and show what is really in this theory. Personally I do not take it readily for one reason, if no other; that is, as Dr. Wilson mentioned, that glandular tuberculosis is in nearly every case, I believe, simply a lighting up of an infection obtained in childhood. That in childhood, the matter of glandular tuberculosis is a matter of resistance of the individual to tuberculous infection, the infection being already there. If an individual lowers his

resistance by dissipation, poor food, bad hygiene, he is apt to develop glandular tuberculosis. I do not believe that the lymphatic tissue on the back of the pharynx has anything to do with it. Possibly in children this lymphatic tissue is an atrium for the infection and I hope Dr. Brownfield will be able to prove whether this is true or not. But I think, from what he has told us, we should take more care of the throats of children, having adenoids attended to in every case. I think along this line we can get a good deal of value from this theory.

Dr. James:—"I do not think that I can add anything. That paper was very interesting to me. My experience has been similar to that of Dr. Thomas; I do not think I have seen more than three cases of gross tuberculosis of the pharynx. In the course of routine examinations of the throats in tuberculous patients, I have run across a great many ccases of chronic follicular pharyngitis, but, do not remember a single case of follicular pharyngitis in a real early tuberculous case. Furthermore I do not remember any of the cases of follicular pharyngitis which do not respond to simple measures of treatment. This paper of Dr. Brownfield's has given us pathological findings and, along with the other men present, I will certainly await, with interest, further reports."

Dr. Brownfield, in closing:—"There is very little more to be said, except to apologize for the incompleteness of the report, but I hope you will understand that I had some difficulties to overcome. It is not always possible to see a patient and tell him you are going to do some cutting on his throat with no other idea than to test some fool theory. I have had this theory and worked along these lines by observation for probably two years; I have spoken to Drs. Thomas and Watkins and a number of other men in town, who are interested in tuberculosis. As I remember they have, in most cases, discouraged me, Dr. Thomas especially. I tried to explain to him that he should encourage young men, but he insisted that young men had better be set right in the start and not be going off on a tangent, trying to find out something that does not exist. However I have been so thoroughly convinced of the importance of the pharynx in these cases that I have given them very careful attention. As Dr. James says, they do respond to treatment, and that is the thing that I laid most stress on, the fact that they do respond to treatment. If this is tuberculous, if a colony of tubercle bacilli is being developed there to feed the lymphatics of the throat and chest and will still respond to treatment, how much more important is this work. Very frequently these follicles will be infected to a very slight extent as to number; I have seen a number of cases with three or four and quite commonly see only one. In one of these cases, there was a single follicle, which was removed completely. I believe it is just as important to remove the primary focus of infection in these cases, if it is tuberculous (which I am not saying positively yet), as it is to remove the primary focus in lues, and we are told that this is very important. Dr. Corbus has said that if we can remove the primary sore in lues it is an important measure in preventing infection of the entire body. Now, if we have more or less of a parallel, I think we must recognize the importance of taking out this primary lesion. If there are three or four, or a half dozen lymphatic follicles infected, if they were in my throat, I feel so confident that they are important avenues of infection, that I would be glad to submit to the removal of each one of them by thorough cauterization. I assure you that we will continue along the lines that we have started; that we will try to prove or disprove the theory; we will try to be fair and will not make an effort to prove our idea, but will simply try to find out whether or not it is true. At some day in the future, Dr. Watkins and I will be able to give a more intelligent report on the subject."

THERAPEUTIC NIHILISM IN TUBERCULOSIS.

BY

DR. A. D. WILSON, Prescott, Arizona.

(Read at the Seventh Annual Meeting of the Arizona Association for the Study and Prevention of Tuberculosis, Phoenix, April 25, 1916.)

One of the prominent facts in the history of medicine has been its tendency to go to extremes. A new cure or surgical procedure, if properly launched, is immediately grasped by an eager profession, placed in the limelight, used to a great extent in a hit or miss manner, and, in proportion to its ability to disappoint or harm, is relegated to the negative swing of the pendulum and consigned to the medical junk heap.

If the therapeutic procedure was possessed of merit, it generally remained for critical observers to resurrect it and place it upon a firm foothold in the middle ground of medical practice.

This unfortunate habit of rushing to extremes is largely due to the impossibility of basing our curative remedies on a strictly scientific ground, and will, no doubt, remain with us until medicine reaches the stage of a more exact science.

While surgery has perhaps escaped these furors to a greater extent than internal medicine, still we have comparatively fresh in our minds the epidemics of Ovariotomy and Tonsilectomy.

I have singled out for my discussion the tendency to extremes in therapeutics as it affects the treatment of tuberculosis.

Before the etiologic factor of tuberculosis was discovered, the treatment of phthisis was entirely an empirical drug treatment. This was undoubtedly pushed to extremes in the endeavor to meet a forlorn situation. The cod liver oil and creosote days still leave a bad taste in our mouths. After the discovery of the Bacillus Tuberculosis, all eyes were centered on a specific cure for the disease. While the bacteriological work on tuberculosis has been of tremendous value, and may ultimately lead to a specific cure, at the present time our therapeutic treatment of tuberculosis must in most cases be carried on just exactly the same as if the etiologic factor were unknown. We must treat the patient as we find him, and to all intents and purposes forget the Bacillus Tuberculosis.

In Pulmonary Tuberculosis we have a chronic infectious disease which centers its activities in the lungs, but which reaches out with its toxins to every tissue of the body. Our endeavor should be to aid nature in neutralizing and excreting these toxic products, and to preserve as nearly as possible the physiological functions of the organism.

Of late years there has been a great hue and cry in the land that the medical profession had no drug in its materia medica that could cure tuberculosis. No mention was made of the fact that we had no drug that would cure pneumonia, typhoid fever, diabetes, etc. This hue and cry was raised largely to get the sick out of the hands of the quack and patent medicine man, but it has resulted in that very familiar reply of the tubercular today, "Why should I go to a physician when he has no drug that will cure my tuberculosis?" It is the same in regard to the climatic-diatetic treatment. The old cry was "Colorado or death." Now the pendulum has swung back so far that they say climatic treatment has no special value—one outdoor air is as good as another.

It is not my intention to go into the relative values of different sections of the country in regard to their curative values in tuberculosis. I simply mention this as another example of the tendency to go to extremes. What is the solid, substantial middle ground of therapeutics in the treatment of tuberculosis?

First, let us consider our pathology, as this is the basis of all scientific medication. The unit of tuberculosis is the tubercle. The result of tubercle is cell-proliferation, infiltration, consolidation and ulceration, plus intoxication.

Intoxication, in some degree, is present whenever and wherever tubercle bacilli live and multiply in the tissue of the body. I disagree absolutely with the theory of a pre-tuberculous stage. I also disagree with the often-heard statement that a patient may be infected and not have tuberculosis. My conception of tuberculosis is the implantation and multiplication of tubercle bacilli in the tissue of the body. This infection may be so slight as to cause no appreciable symptoms, but it is tuberculosis, nevertheless, and differs in degree only from a readily recognizable tuberculosis.

The medicinal treatment in tuberculosis is two-fold: First, the treatment of symptoms due to the presence of tubercle in the lung. Second, the treatment of symptoms due to intoxication.

Under the first heading, our principal concern is the cough. There is an old axiom that "there is nothing worse for a cold than a cough," and this applies more especially to tuberculosis. Every cough means a distension and wracking of the alveolar tissue of the lungs in which we may presuppose there is going on a healing process. Cough is generally due to irritation of the bronchial mucosa. This may be due to necrotic material from a tuberculous focus or to a simple bronchitis which is always present in the region of tuberculous infiltration. The regulation of cough should always be in direct proportion to the amount of sputum raised. A patient who raises a mouthful of sputum with each cough cannot be helped to any extent by controlling the cough, although a sedative at night will prolong the intervals and allow a more generous accumulation, thereby giving the patient more rest. The general routine is to have the patient get a good

clean-out morning and night, and control any excessive coughing in the interim. The control of excessive cough is accomplished by the opium derivatives, Heroin and Codeine, and by inhalation. Severe night coughs that disturb the rest of the patient are treated by morphine grains 1-8 hypodermatically. I am sure that any possible harmful effects of the drug are more than counterbalanced by the rested condition of the patient in the morning. I wish to say a few words in regard to inhalation. It is routine for all moderately advanced cases to use a respirator containing equal parts of creosote, spirits menthol 20% and spirits chloroform. This is worn at convenient intervals and as often as possible. While much has been said in respect to the lack of value of drugs used as inhalants, I find that it helps my patients, and that once they have used them they are very loth to give them up. They are especially useful in the useless, non-productive cough of bronchitis associated with tuberculosis. Another factor which is of importance is the care of the uvula and pharynx. Most coughing cases develop an elongated uvula and a chronic pharyngitis. This condition is often responsible for much of the excessive coughing, especially if it be of a gagging nature. The uvula can be readily shrunk up by the application of tannate of glycerine, and the pharyngeal condition can be held in control by silver nitrate 20 grains to the ounce.

I need not mention that the patient should be instructed to practice control in matters regarding cough.

Hemorrhage I shall pass over lightly. This condition arouses both patient and physician to action, and is generally properly treated. I will simply state that it has been my experience that emetine hydrochloride in 2-3 to 1 grain doses is most efficacious in those patients who have recurring small hemorrhages. The dose is regulated by the nausea and depression of the patient.

We have now to consider the harmful effects of intoxication on the various organs of the body. We might include every tissue of the body under this heading and not be far amiss. The toxemia of tuberculosis burns up the fat, interferes with the tone of the muscle, both smooth and striped, deranges the nervous system, upsets the gastro-intestinal tract, interferes with the proper functioning of the cardio-vascular system, and liver. Here lies the great ground for the drug treatment of tuberculosis. We all try to put the fat back on our patients and restore their vigor by proper feeding and rest, but I think you will agree with me when I say that the only type of patient who really makes a permanently satisfactory showing on this line of treatment are the early cases.

I will first consider what I take to be the most important system—the cardio-vascular. The first effects of toxemia are shown in this system. The increased, unstable pulse, sweating, and low blood pressure are all signs that point to toxemia. My discussion will only consider that class of patients who come to us moderately advanced or far advanced. These cases invariably show a rapid pulse, moderate right-sided cardiac hyper-

trophy, low blood pressure, the dripping axilla, and moist palm. Bed rest is not sufficient for these cases. The heart must be helped. The vaso-motor nerves must be stimulated. My plan is to give Tincture Digitalas No. XV. twice a day until the physiological action is established. I then give Tincture Digitalis 3 min., Strychnine 1-60, and Tincture Belladonna Min. 3-8, three times a day. This mixture I keep up indefinitely, the results in most cases are more than satisfactory. The pulse is slowed and strengthened, blood pressure is raised from 20 to 30 m. m. of Mercury, the skin is tightened up, the patient stands exercise such as an examination without sweating, the heart action is improved, the first sound is sharp and clear, and the second pulmonic, which is most often accentuated before treatment, returns to more nearly normal.

Tuberculosis is mainly a chronic disease because of the avascular condition of the tubercle. We must maintain as high a blood content in the vessels surrounding the diseased area as the heart and vessels will permit. You have all seen the effect on a leg ulcer of venous stasis. You have also seen, no doubt, the benefit of posture cardiac tonics and strapping. You may rest your leg ulcer until doomsday and still have an ulcer. Correct your arterial and venous interchange and you will have granulations that will bloom like a rose. Pulmonary tuberculosis that has reached the stage of NECROSIS is lung ulcer. I would not leave this condition without mentioning the great usefulness of hydrotherapy in maintaining a circulatory equilibrium. Properly applied cold water drains the skin of a large and harmful over-supply of blood. Dilated peripheral arterioles means low blood pressure and increased heart action. Get the blood back into the large vessels where it belongs, but be sure your heart is equal to its job. Most of the benefits derived from outdoor life in circulating air is due, I believe, to the action of the colder air upon the vaso-motor nerves in the skin. The greater the difference in temperature between the air and the skin, compatible with comfort, the greater the benefit.

Before leaving this phase of the subject, I will dwell lightly on the condition of the blood itself. A blood count reveals very little in tuberculosis. Still, it is generally conceded that there is an actual diminution in erythrocytes in the blood content. I make a routine use of Iron Arsenite hypodermatically in all cases that are emaciated. This procedure certainly seems to stimulate the blood-forming tissues, and to improve the quality of the hemoglobin. One of the first organs to suffer from toxemia is the stomach. It has been well said that "a good stomach is the consumptive's best friend." This condition of the anorexia must be remedied. The treatment of marked loss of appetite consists mainly in absolute rest. Nothing else will take its place. In all cases, in addition to rest, I give dilute Hydrochloric Acid in 20 drop doses after meals and milk feeding. In all bodily conditions accompanied by exhaustion, the acid secretion of the stomach is low. Properly acidulated chyme is absolutely necessary to

stimulate active intestinal digestion. I find that patients on acid regain their appetites more quickly and complain less of what is practically forced feeding. The bowels should be watched carefully. Regular bowels to a patient generally means that the bowels move daily without regard to the number of times, consistency or amount of odor. My standby in intestinal stasis is Cascara in sufficient sized dose to get results.

Salines should be avoided, as they tend to deplete the serum content of the blood, with a consequent loss of anti-bodies. Patients with foul stools that do not readily clear up on mild intestinal stimulation are given a daily high colonic irrigation with Ichthyol 2 drams to the gallon. The change in the condition of a patient having several foul, loose movements daily is very often most gratifying. We sometimes see patients who complain of an almost constant desire to go to the stool. I use Tincture Belladonna in this type, and find that I get results. This condition is due, I believe, to intestinal ulceration, with subsequent scar formation, interfering with a normal passage of the bowel contents. Belladonna tends to relieve spasm and enlarge the caliber of the intestine.

I have not taken into consideration any of the concurrent diseases with which the patient may be afflicted. Neither have I attempted to exhaust the Materia Medica. My sole desire has been to draw attention to the fact that in treating the tubercular, we should treat the patient and not the disease.

DISCUSSION.

Discussion by Dr. A. H. Williams:—Dr. Wilson's is a hard paper to discuss, because everything he said one must agree with. It is a helpful thing to have a review like this, and go over the things we do for our patients, because we all feel sometimes the helpless sensation that we are doing nothing. I think it is often well to sum up and see how much we are doing. I would like to add one suggestion to the paper in regard to the treatment of anorexia, and that is to put the patient entirely on liquid diet which requires no chewing and is easily assimilated. This will relieve some anorexias, which are simply mental conditions arising from the monotony of diet; this monotony is very difficult to get away from either in a sanitarium or in a private home. These patients have little else to think about besides their food, and if we pay some attention to variety of food and to making it attractive, we will have less anorexia.

Dr. Wilkinson Discussing Dr. Wilson's Paper:—It seems to me this is a most excellent paper and we have all listened to it with a great deal of interest and profit. The medical profession is not alive and it is not strange that it is not alive, to the use of electro-therapeutics in tuberculosis, as well as other subacute and chronic conditions. Our medical colleges have not taught this form of therapy in the past. The Postgraduate Medical School at Harvard University now has a chair of electro-therapeutics, occupied by Dr. Frank B. Granger. That being the case, it seems to me that I need make no apology for bringing this matter before our Society. A recent number of the Journal of the A. M. A. gives nearly a column of comment on the work of Kupferle and Bacmiester working under a subsidy from the Koch foundation, who have been treating rabbits with the X-ray after inoculating them with tubercle bacilli. They report brilliant results. Also Bacmeister reports ten latent cases of lung tuberculosis which have completed their course of Roentgenotherapy, all clinically cured. Three cases had been in his sanatorium for fourteen, eight and five months, but the tuberculosis had progressed until the Roentgen treatment was applied. That Journal will not give any space to the men in this country who are working along that line with brilliant results, and that is true not only with regard

to the X-ray, but of all branches of electro-therapy. Any article written abroad commands some attention, but any article written in this country cannot secure their attention. That has changed somewhat in the last year or two. Dr. J. D. Gibson of Denver, during the past fifteen years, has been very successful in treating tuberculosis and I have been following his work for the past six years and have visited him several times. I am convinced that he gets more results in four weeks than we, as a rule, get in four months. He will use everything that Dr. Wilson has suggested, in addition to the X-ray. His treatment consists in raying the chest every other day and on alternate days giving static treatment. Dr. Yates of Florida for the past five years has contended that pellagra is a disease of metabolism, and while that is not altogether proven, I believe it will be proven, and he has been curing most extreme cases of pellagra by the use of the static current. Now, if we can take a disease like pellagra and cure that with static treatment, bring about elimination, stimulate metabolism and the activity of the ductless glands, why is it not of value in the treatment of diseases like tuberculosis?. It certainly has proven efficient. I also wish to call your attention to Dr. Gibson's statement, made several years gao, that the X-ray is a modified form of light ray. The physics' Nobel prize for 1914 was recently awarded Knax von Laul, a Frenchman, for proving this fact, which is a very interesting one in connection with the X-ray. Prof. Von Laul passed X-rays through a crystal and photographed them and proved that they were the same as ordinary light except that they are only one one-thousandth the length of the light rays.

Dr. Donald Macrae, of Council Bluffs, Iowa:—The paper of the last speaker mentions what he seems to think is a fact, that the internist is up against more of a tendency to change than is the surgeon. I wish to give a little experience to show that the surgeon is up against this same thing. Two years ago when in Zurich, Dr. Sauerbrouk demonstrated his method of taking care of early tuberculosis of the lung. He claims that it always begins in one side and therefore, as some of you may be familiar, he resects from the fourth to the ninth ribs, taking out four inches; then bringing these together in order to tighten up the chest; then he cuts the phrenic nerve in order to put the diaphragm at rest, and claims a large percentage of cures. It does not seem to me that I would want to submit to this. A few days later in London, we had the pleasure of seeing Mr. Lane work on a resection of the colon, and heard him tell us that in all cases of tuberculosis, the large intestine should be removed. I saw a complete resection of the colon in a case of tuberculosis of the wrist, the man having absolutely no intestinal symptoms, except constipation, possibly resulting from intestinal stasis. So, after all, the surgeon is up against something. Shall we cut the phrenic nerve or take out the large intestine, inject Tuberculin, or depend on the climate? In other words, if I were writing a paper, the title would be: "Where in H—l are We At?"

Dr. Wilson, closing discussion on his paper:—In regard to Dr. Williams' remarks on anorexia. Toxic anorexia is rather easily distinguished from a monotonous diet. We all recognize that the tubercular needs an occasional change; nothing helps a diet like a complete change of it. Personally I am not pessimistic in regard to the treatment of tuberculosis. If I were a pessimist I would not treat tuberculosis. I cannot imagine anything further from my viewpoint than a pessimistic man treating tuberculosis. We cannot cure them all, but we can help a good many. Our viewpoint at the present time, in most cases, is absolutely one of instruction. Individually we do not have the opportunity to go into the matter of prevention; that is a question of dollars and cents, and we have not got the money. We are beginning to appreciate the fact that tuberculosis can be prevented, to appreciate how tuberculosis starts, when it starts and the mode of propagation, but no private organization is in a position to undertake a campaign of sufficient importance to make it worth while. Nothing will be done in the line of tuberculosis until the Government puts its shoulder and its capital behind the wheel. In the meantime, our position is one of creating a certain amount of public sentiment. We have done that and are still doing it. One of the reasons that it seems difficult to accomplish results in tuberculosis is because we get discouraged; the other reason is that the ordinary case of tuberculosis never gives the doctor a chance. Unless the patient is under the complete control of the physician, the ordinary floating case of tuberculosis will have just about as much chance of getting well as the advanced case does. Unless the patient is willing to give the physician a chance to apply his therapeutic measures, we certainly cannot say that the doctor has had the opportunity to do his best.

GUNSHOT WOUNDS OF THE KNEE.

BY

F. P. MILLER, M. D., El Paso, Texas.

(Read before the El Paso County, Texas, Medical Society, Sept. 4, 1916.)

The ease with which the serous-lined surface of articulations becomes infected and the consequent destruction of the endothelial layer and inevitable adhesion within the joint and the periarticular tissues, gives this class of injuries serious surgical interest.

Once we have had infection with its legitimate consequences, the perfect restoration of function, which implies the ability to bear the weight of the body as well as simple flexion and extension, is doubtful.

Given a gunshot wound through the synovial membrane of the knee in which no foreign material such as clothing or a portion of the missile has been left in the structures involved, we have a simple penetrating wound with hemorrhage into the joint. This class of cases will be rare, indeed, and the treatment should be the same as applied to a simple infection of the synovia.

The entire surface of the knee should be thoroughly cleansed as if operation was contemplated. I confess to being partial to the use of iodine in half strength solution as the final application. For a small penetrating wound the entrance and exit should be closed with a collodion dressing for the first three days. Large wounds would demand a sterile gauze dressing. The limb should then be placed in a Buck's extension appliance to relieve the intra-articular pressure, and muscular contraction. There is invariably a serous exudate and more or less hemorrhage into the joint, and this should be relieved by aspiration. This relieves the culture medium of infection and through the same needle you should inject the joint with 2 per cent. formalin-glycerine, as used by the late Dr. Murphy. (1)

This is prepared by adding ten drops of formalin to each ounce of glycerine. This should never be used until sterilized in a steam sterilizer under pressure and the solution should be twenty-four hours old to allow the formalin to dissolve in the glycerine. From two to twenty c. c. of this solution is injected into the joint, depending upon the size of the joint, and the degree of dilation of the capsule.

If there is no contra indication, I prefer to introduce the needle just beneath the outer edge of the patella. Free motion of the needle will indicate the entrance of the point into the joint. A small dose of morphine is indicated. However, if the Buck's extension is properly used, there will

not be much pain. The injection of formalin-glycerine may be repeated if fever is present, and aspiration of the joint may be often indicated for swelling. An ice bag over the joint is useful for three or four days. The formalin-glycerine solution is said to coffer-dam the lymph spaces in the joint. In the absence of fever you need not repeat the injection.

Should you delay the application of the Buck's extension a few days, there will be muscular contraction and the pain will become so great that it will require great force and an anaesthetic to straighten the limb, and will require the liberal use of morphine.

Patient should remain in bed with extension for two weeks. Passive movements and massage are now instituted, the further stay in bed depending upon the indications.

It will be rare that you find a gunshot wound of the knee in which some foreign body has not been introduced. The same general features are present but the infection is sure if radical treatment is not instituted.

An X-ray should be made in locating the bullet. A large wound of exit is not alone sufficient proof that a portion of the bullet is not retained within the joint or the adjacent bones, and the failure to X-ray such a joint may result in much embarrassment to the surgeon.

I have endeavored to inject the formalin-glycerine with a large metal syringe through the wound of exit, with the idea of forcing out small pieces of clothing through the wound of entrance, but have never been successful with such procedure.

Given a gunshot wound of the knee in which we have reason to believe that infective material remains in the joint or a foreign body is retained in the bone communicating with the joint, I would advise the free exposure by means of either the horseshoe incision going through the patella ligament or the "S" shaped incision splitting the patella longitudinally. The limb would be prepared as described in the first class of cases.

It has recently been my plan to flush these joints with the formalin-glycerine solution, using a large metal syringe, introducing the nozzle through the wound of exit and allowing the fluids to pass out through the wound of entrance. The joint comes to the operating table filled with this solution. In such a short time it can only do a minimum amount of good in closing the lymph spaces, but I am sure that this application even for a short period of time is of decided benefit in preventing infection.

The joint is now opened and all foreign material thoroughly searched for and removed, and joint cavity closed without drainage entering into the synovial structures. However, drainage is used down to the serous surfaces to drain the superficial tissues.

Theoretically the "S" shaped incision which allows the patella to be sawed through longitudinally would seem to restore the joint more thoroughly than the "U" shaped incision through the patella ligament. This last incision has given good results.

To illustrate the type of cases which are seen immediately after the wound has occurred and before infection has taken place, I present this history:

G. T. Age 14. Male.

On May 28th, 1916, while seated on a cot with knees flexed at right angle, sustained an accidental wound from a .32 caliber pistol. The bullet entered the left knee from the inner side at the lower border of the patella, passing backwards and outwards through the intercondyloid fossa and lodging in the external condyle of the femur about one-half inch from the external surface at the epiphyseal line.

Swelling from hemorrhage was present. In half an hour an X-ray was made, locating the bullet as described. Formalin-glycerile 2% was injected into the joint and an "S" incision made through the patella by sawing through the median line.

A piece of the boy's stocking was found in the joint. Slight hemorrhage in the epiphyseal line indicated the tract of the bullet on the outer side. An opening was made below this line and the bullet forced through the external opening. The synovial membrane was closed with catgut sutures and the joint filled with formalin-glycerine. The patella fascia was sutured with chromic catgut, patient put to bed with Buck's extension, drainage at the wound of entrance down to the deep fascia. There was very slight inflammatory reaction.

Patient was in hospital two weeks, then sent home and remained in bed another two weeks, then was allowed to be about on crutches and at the present time gets around with fair movement. At present he has a movement through an 11½-inch arc.

Another case illustrating this type, but of a longer duration between accident and the operation, is the following case:

F. H. Age 13. Male. Messenger boy. Date, June 19, 1914.

Two days ago was accidentally shot in the right knee with a .22 caliber rifle ball. The entrance wound was directly through the patella in an anterio-posterior direction. There was no wound of exit.

There was noticeable swelling. The depression on each side of the patella was absent, limb semi-flexed, and patient complained with pain on movement. Joint was injected with glycerine-formalin solution and a "U" shaped flap incision made, opening through the patella ligament and the ball found imbedded in the cartilage in the inter-condyloid fossa.

The synovial membrane was closed with catgut sutures in such a way as to bring serous surfaces evenly together, then lateral ligaments and the patella ligaments were closed with chromic catgut sutures. Two drains were placed so as to reach to the serous membrane but there was no drainage directly into the joint.

The limb was placed in a plaster paris splint, which remained in place for a period of three weeks. Buck's extension was not applied for the first few days and the patient suffered considerable pain. Febrile reaction was slight and there were no other symptoms of inflammatory reaction. Slight movement was now permitted. At the end of four weeks patient was permitted to go about on crutches. At the end of six weeks the case was dismissed with movement of 11½-inch arc.

About three months later, in trying to jump upon a moving bicycle, he received a fall with fracture through the junction of the upper and middle third of the shafts of the femur, and was kept in plaster with traction for about six weeks, when he was dismissed and resumed work with a fairly useful limb.

Some four months later he was killed by Villa soldiers in Juarez.

To illustrate cases in which infection has occurred, the following is of interest:

Edward Ochoa. Age 6. Male. Date, February 12, 1916.

Sixteen days previous was accidentally shot in right knee with a .32 caliber rifle ball. The wound of entrance was through the external lateral ligaments, then passing through the articular surface of the tibia. The wound of exit was about one and a half inches below the inner side of the head of the tibia. The bullet then passed through the left tibia and fractured the left fibula about three inches below the left knee joint.

This case had been treated with a gauze drain pushed through the wound of entrance to the wound of exit. Infection had taken place in the right knee joint. The swelling was so great as to make the limb almost uniform in diameter with the thigh. Patient had a temperature of 103 and pulse 120, with a history of chills, fever and sweats.

Patient was removed to hospital, the joint opened freely by "U" shaped incision, cutting transversely the patella ligament, and the joint freely irrigated with normal salt solution. Pieces of the clothing were found free in the joint and the serous surfaces were rough and inflamed and erosions in the cartilage had taken place.

The wound was closed in the usual manner with drains down to the synovial membrane but not projecting into the joint, and through these drains glycerine-formalin was injected. Drains were freely placed above and below the articular surface where periarticular abscesses were found. Buck's extension was applied and the limb placed upon a posterior splint.

There was considerable febrile reaction. The joint was aspirated and formalin-glycerine injected. This was repeated every day for three days and then aspiration for two days and the formalin-glycerine again re-injected. Ice bags were used over the joint. The infection in the joint subsided. However, a deep popliteal abscess developed which required

drainage. Patient remained in hospital three weeks and was in bed at home about another three weeks.

There is some movement in the joint at this time, but the periarticular inflammation is responsible for most of the scar tissue restricting movement.

In conclusion:

First. These wounds produce one of the severest accidents that can happen to a patient, and the surgeon should take due precaution to prevent infection in the joint cavity.

Second. Conservative treatment is permissible if the punctured wound leaves no foreign body in the joint. This means aspiration with injection of formalin-glycerine, Buck's extension, and the use of ice bags and opium.

Third. X-ray should be used to locate foreign bodies of a metallic nature. The possibility of the joint being infected from clothing should not be overlooked. This class of cases requires free opening and examination of the knee joint. This treatment to be followed by injection of formalin-glycerine, aspiration, Buck's extension, and ice bags.

Fourth. Cases which have been long infected should be freely opened and foreign bodies removed, formalin-glycerine injected and aspiration. No drains should be placed in the synovial cavity, but carried down to serous surface. However, good drainage into the periarticular structures should not be overlooked.

CHRONIC EMPYEMA OF MAXILLARY SINUS. OPERATION BY INTRANASAL ROUTE.

BY

JOHN J. McLOONE, M. D., Phoenix, Ariz.

(Read at the 25th Annual Meeting of the Ariznoa State Medical Society, Phoenix, April 27th, 1916.)

Notwithstanding the fact that in the past decade, the diagnosis and treatment of diseases of the other nasal accessory sinuses has undergone a marked evolution, maxillary sinusitis is of still more frequent occurrence than affections of its fellow sinuses. This is accounted for by the fact that in empyema of the antrum of Highmore there is one more etiological factor to be considered, namely, the close proximity of the alveolus and the roots of the teeth to the floor of this cavity.

It was formerly thought that all infections of the antrum were of dental origin. There is a wide diversity of opinion as to the percentage of cases of maxillary sinusitis that can be traced to an abscessed tooth or a diseased alveolar process. Hajek claims that only 8% can be attributed to this cause, while Tilly would place the number at 100%. Skillern's estimate of approximately 20%to 30 % of antrum infections being due to diseased teeth, is perhaps more closely in accord with the experience of rhinologists. We know, too, that a diseased antrum may be the causative factor in a dental abscess. Skillern observes that maxillary sinus empyema may result from a diseased tooth, not only by direct continuity, but also through a periostitis, through the circulatory system or from a circumscribed or diffuse ostitis of the alveolus.

The most frequent cause of infection of this sinus is by direct bacterial invasion through its ostium, from the nasal mucosa. The normal opening of the maxillary sinus is far removed from the sinus floor and is partially occluded by the anterior portion of the middle turbinate. Anotomically, therefore, the antrum of Highmore, having once become the seat of a purulent process, lends itself favorably to pus retention.

Maxillary sinusitis is generally unilateral, sometimes bilateral, rarely there is pansinusitis. I shall briefly report a case that came under my care about a year ago, in which the entire accessory sinus system on one side of the head became involved as a result of purulent inflammation of the antrum.

Patient, miner by occupation, age 46. History of nasal discharge extending over a period of six years. Said that he had some dental work done on teeth of upper jaw several years ago. Was frequently obliged to blow a large amount of pus from nose. Large accumulations of purulent matter in post-nasal space, especially in

morning. Feeling of dullness and neuralgic pains, referred to supraorbital region. Dizziness upon stooping, subjective sense of fetid odor.

Examination showed left nares almost entirely occluded by a markedly deviated septum. Pushing septum to one side by means of a long Killian speculum, a large quantity of foul smelling pus was seen in the middle meatus.

Ethmodial region showed polypoid degeneration. Second bicuspid and first molar tooth diseased. Antrum punctured with a Krause trocar, washed with saline solution, and a large quantity of foul smelling pus and cheesy detritus evacuated. Marked tenderness over frontal sinus led me to suspect involvement of this region, and patient was referred for X-ray examination. Skiagram showed a diseased condition of all the sinuses on the same side, as the affected maxillary cavity. X-ray findings were later confirmed clinically. Radical intra-nasal operation of the antrum together with removal of diseased ethmoidal cells and correction of deviated septum resulted in a cure, thus establishing the diseased maxillary sinus as the chief etiological factor in this particular case of pansiunsitis.

Subjective symptoms in chronic empyema of the antrum are not so marked as in the acute form. Pain may be moderately severe, but is rarely present in the antrum alone. The pain is intermittent and neuralgic in character and is often referred to the supra-orbital region. There is frequently a feeling of fullness and tenseness of the head on the affected side. Percussion over the malar process or in the infraorbital region will usually elicit tenderness. Killian believes the pain to be due not only to involvement of the trigeminal nerve endings, but also to the direct irritation of the main trunks. Disturbances of olfaction, taking the form of complete or partial loss of the sense of smell or of a subjective bad odor, are frequently noted in the chronic cases.

The chief objective sign of antral empyema is the appearance of pus in the middle meatus. The purulent secretion is present in greater abundance in the morning, due to its exit through the normal ostium while patient is in the recumbent position. Hyperplasia of middle and inferior turbinates and septal mucosa, is a frequent result of their contact with the irritating secretions.

It is as a rule not difficult to diagnose a case of empyema of maxillary sinus. Pus in the middle meatus does not necessarily mean that it comes from the antrum. It may come from the anterior ethmodial cells or frontal sinus. Trans illumination and skiagrams when properly interpreted are valuable aids, but by no means infallible. Fortunately we have always at our command a very simple and harmless procedure, namely needle puncture of antral wall, beneath the inferior turbinate, which will give us positive information as to the presence or absence of pus in the cavity.

Treatment:

Should the condition be caused by a carious tooth our first step in line of treatment is clearly apparent. The diseased tooth should be taken care of by a competent dentist, meanwhile frequent irrigation through opening in naso-antral wall should be practiced. If the pathological changes in the sinus mucosa have not progressed too far, washing out the antrum through an artificial opening will often effect a cure. On the other hand, if the

case is of long standing and the normal sinus mucosa has been replaced by a fibrous overgrowth of connective tissue, or if hyperplastic or ulcerative changes having taken place, an operative procedure more or less radical in scope is indicated.

It has been customary among rhinologists to adopt conservative measures first, and then if a cure is not effected to make use of more radical operative procedures. The Krause operation whereby the anterior end of the inferior turbinate is removed and a small opening made in antral wall, is perhaps the most frequent operation performed intra-nasally. The objection to this operation is that it does not permit of inspection of the antrum or of completely eradicating the diseased processes that may present. The following operation which I shall describe, makes possible the opening of the maxillary sinus by the intranasal route and permits of inspection of the entire cavity by anterior rhinoscopy. The main points in the technique were first evolved by Camfield with a later modification by Ballenger, namely, the preservation of the inferior turbinate intact.

The consecutive steps are as follows. The mucous membranes of the inferior turbinate and nasal antral wall is swabbed with a twenty per cent. solution of cocaine. A few minims of two per cent. cocaine with adrenalin are injected underneath the periosteum of the canine fossa. Incise the mucous membrane over the whole extent of pyroform angle down to the floor of the nose. The mucous membrane of canine fossa and nasal antral wall is elevated, lifting the inferior turbinate toward the septum. The antrum is now opened at the pyroform angle by means of a chisel or electric trephine. Sufficient of the bony wall is removed with the rongeur forceps. If the inferior turbinate is found enlarged and hyperplastic I remove same to an extent that will insure a permanent communication between the antrim and nose. The easy inspection of the entire cavity is facilitated by the use of a short Killian speculum. Hemorrhage is controlled by the use of gauze saturated with adrenalin. Subsequent treatment will depend upon the condition of the interior of the sinus. If the mucous membrane has undergone polypoid delegeneration it will be necessary to curette same. Iodoform gauze is used in first packing and left in place for two days, afterwards gauze saturated with compound tincture benzoin will effectively relieve the edema and promote healing.

I have performed this operation several times during the past two years with very gratifying results. It possesses certain advantages over the external operation in as much as it can be done under local anasthesia and in a comparatively shorter time. The danger of infection from the mouth, necessitating a long course of after-treatments, is avoided. It permits of direct inspection as well as a thoroughness in eradicating any diseased process that may be present, which was formerly only possible by the combined internal and external operations.

ADDRESS OF THE PRESIDENT OF THE EL PASO COUNTY MEDICAL SOCIETY.

BY

DR. JOHN W. TAPPAN

(January 8th, 1917.)

It has always seemed to me that the President's annual address to the Society might be read with better effect at the last meeting of the year, or one near the last, at least, rather than at the first over which he presides, for, as the year goes on, he will have gained much valuable experience and will have in hand knowledge whereof he may speak. As custom wills it otherwise, I am reading this address tonight at the first meeting over which I have the honor to preside, and am making a few suggestions which I hope may be approved by the Society.

In looking over former presidential addresses I find that the suggestions that I am about to make have all been made before at one time or another, so I claim no brief for originality. Some of these suggestions have assumed concrete form; as a result the Society has in its own rooms a library of some 5,000 volumes, the *Bulletin* has been merged into a representative *Journal*, and advances have been made all along the line.

It seems to me, however, that the rapid growth of the Society now justifies a modern up-to-date building with offices arranged as we want them, with a meeting hall, club rooms and library on the top floor. Such a proposition has been suggested. It can be carried out in one of several ways. The plan Dr. Hugh Crouse had in mind was one, and I think a good one. Another is that suggested by what has been done in other cities. I am assured that a guaranty of fifty physicians signing up for offices will be all that is required to secure us a building on a site approved by us with plans of our own making. In other words we can get what is called a Class A building planned by ourselves on a site approved by us if fifty doctors will guarantee to rent office room in it when completed. There are also our good friends Roberts-Banner to consider. They might put us up such a building on similar terms—they could if others could.

But whatever methods are employed to gain the end in view must rest with the Society. I earnestly recommend the matter for your serious consideration. There will be many obstacles to meet and overcome but the gain will be worth the trouble. I shall work, with your approval, for a home for the Society of which we shall be proud and which we *must* have eventually. We have already outgrown our present bounds both for a meeting place and for library space. During Dr. Carpenter's administra-

tion the number of volumes in the library has doubled. He has taken great interest in it, and, together with Dr. Wesson, deserves much credit for the excellent showing we can now make with our library. Dr. Carpenter put in an index for us and he tells me that while an attendant librarian was present from May to October, 1916, the library was well patronized. It seems to me that, with an attendant present, our library would be worth much more to all of us—members as well as visitors, and an attendant is certainly necessary to look after it.

In regard to the business of the Society, the time has arrived for an Executive Committee. We waste much time at our meetings in the discussion of business which might well be pre-arranged for us by such a committee. The committee on the revision of the Constitution and By-Laws has the matter in hand, but, if the Society approves, I should like to appoint such a committee until the revised Constitution is adopted. I would suggest that such a committee might consist of the President, Vice-President, Secretary-Treasurer, the Chairman of the Board of Censors and the Chairman of the Committee of Public Health and Legislation. It could transact all business, subject to the approval of the Society, and avoid much profitless discussion at the regular meetings.

The President has, according to the By-Laws, the appointment of two committees—one on Public Health and Legislation, the other on Program and Scientific Work. I do not know what, in the revision of the Constitution and By-Laws, will become of the Committee on Program and Scientific Work, as one of the members of the revising committee tells me he is in favor of "cutting it out." Their work, he says, has usually devolved upon the Secretary-Treasurer, and he can see no good reason for continuing an inactive committee. I believe that this committee should continue with the addition of the Secretary-Treasurer as a third member. Its work is very important and should be done. If the committee will become more active it should be of much help in lessening the burdens of the already overloaded Secretary-Treasurer.

These two committes, Program and Scientific Work, (consisting of Drs. W. L. Brown and Pickett) and Public Health and Legislation (consisting of Drs. Wesson, Jamieson, and Brunner), will be continued with the same personnel during the year if the members will continue to serve. I do not understand that I have to re-name the other committes appointed by my predecessor, but if I do, I should like to make it plain that all committees are hereby re-appointed. To the Library Committee (consisting of Drs. Vance, Miller, and Wright, with Mr. Primm and Mr. Dudley), I wish to add the name of Dr. Carpenter.

In regard to the time of meeting, I wish to start at a given hour promptly—whether this hour be 7:30 or 8:00 I leave to the Society—but let us start promptly at the time set on the cards and adjourn at 10:00.

As regards the scientific program, the order, I think, should be (1) clinical cases, (2) papers and discussions, (3) clinical reports and (4)

pathological specimens after the discussions. I know of nothing more discouraging to paper writing than having one's paper crowded to a hasty finish by long clinical reports, and I shall endeavor to adhere to the subjects in order as stated above.

I also wish to call attention to that part of Chapter II of the By-Laws which says that "crisp papers and discussions and reports of cases shall be arranged for and encouraged and tedious and profitless proceedings and discussions shall be avoided as far as practicable *and no member shall speak more than once on any subject.*" It seems to me that this section should be enforced in our meetings. I cannot do much without your loyal support and help. I therefore ask this and crave your indulgence for the shortcomings I may have.

Finally I wish to say that a beloved character has passed from among us. Dr. Kluttz has lived his life—a life of devoted and painstaking effort. A truer, better man never lived, and he died, as he lived, a patient, noble gentleman. A committee has been appointed to draw up resolutions of condolence to be sent to Mrs. Kluttz, and a floral tribute to his memory was sent to the grave in the name of the El Paso County Medical Society. May he rest in peace.

LYMPHADENITIS OF THE MEDIASTINUM.

BY

DR. M. P. SCHUSTER, El Paso, Texas

(Read before the El Paso County Medical Society, April 17, 1916.)

Mrs. J. V., 28 years old, Mexican, married fifteen years, has borne six healthy children, of which the third died at the age of three years. The rest of them are alive and well; the oldest 13 years old, the youngest 10 days, when patient was last seen by me. In the last child-bed she was attended by a Mexican mid-wife, and was normal so that patient got up on the fifth day. Up to that time and previous to her confinement she felt perfectly well, with the exception of a slight cough, to which she paid no attention and which she remembered only on close and searching inquiry. But on the following day, the sixth after her delivery, suddenly a big swelling developed over the upper part of the sternum, the lower part of the front of the neck, and the supraclavicular fossa, accompanied by high fever and severe cough.

I saw the patient on February 8th. She was found in a half sitting position, with distressed facial expression, slightly cyanosed, breathing rapid and wheezy, both on in- and expiration, nostrils flaring, temperature 103°, pulse about 130, small and fluffy. Soft oedema over the upper part of the sternum and on both sides of it, in the jugular fossa and the supraclavicular fossae. In the region of the insertion of the sternomastoid muscles on both sides a lump about the size of a hen's egg; the skin over the lump not adherent and of normal color. No tracheal tug; laryngoscopic examination revealed a pale mucous membrane, no displacement or narrowing of the trachea, visible almost down to the bifurcation, normal motion of the vocal cords on singing and breathing, the voice weak, but not hoarse.

Percussion revealed in front an area of intensive dullness all over the breastbone overlapping the same to the right about two fingers' width; a little less to the left and merging into the dull area of the heart; heart sounds normal but weak, the pulse slightly unequal in the two radials. The breathing was wheezy, on auscultation harsh, almost tubular in the upper part, decidedly muffled further down; the cough paroxysmal and unproductive, a little glary mucous excepted. Abdominal organs normal; lochia scanty, no complaint of any kind concerning pelvic organs; no lumps higher up, nor in the axillary or inguinal regions. Liver and spleen of normal size.

Patient sleepless; patient given codeine for alleviation of cough and hydrargyrum inunctious for the absorbent effect.

On the 21st an incision was made over the lump at the sterno-mastoid insertion, which has become somewhat pasty of feel and slightly reddened; a small amount of pus and black blood was evacuated, drainage tubes introduced. The following day the temperature dropped to 101.6 degrees and patient felt somewhat relieved, but the cough was unchanged. For about a week the condition remained the same.

On the first of March temperature 101.4 degrees. Another incision is made two fingers in width above the first and a half ounce of pus evacuated; drainage.

March 5th temperature 100.2 degrees, pulse 120, weak. Subjectively better, but complained of persistent cough. Swelling over left clavicle less but over the right clavicle increasing. An incision on this side produced a little pus and blood, drainage tube introduced deep into the friable tissue. The following day slight discharge.

On March 11th an X-ray picture was taken showing as follows: On the right side of the breast bone a dense shadow, about three fingers in width, reaching from the third rib to the dome of the diaphragm, and running parallel to the vertebral column. Apex as well as rest of the lungs on this side perfectly free. Over the sternum a dense shadow continuous with the right shadow and extending into the left apex, down to the third intercostal space. In the lower region of the left lung several dense foci.

During the following week the temperature fluctuated between 100.2 and 101 degrees, the pulse between 128 and 140. An X-ray treatment was given over the upper half of the sternal region (2 caloms).

March 22nd excision of a piece of tumor from the left side and the tissue sent to Dr. Waite for examination, who reported lymphoid tissue in state of inflammation and edema. The patient's condition becoming more unfavorable, was finally sent to the hospital on the 28th of March with a temperature of 102 degrees and a pulse of 140.

A blood examination showed 3,322,666 red corpuscles and 11,200 white. A differential count shows polynuclear neutrophiles 60, polynuclear cosinophiles 19, mastcells 1, small lymphocytes 2, large lymphocytes 3, megaloblasts 2, Mononuclears 13, Haemoglobin 80%, Poikilocytosis.

Urine examination: Reddish brown, clear, specific gravity 1020, acid, no albumen, Trommer test shows some greenish brownish discoloration, Indican strongly positive.

Another X-ray treatment was given over sternal region (2 caloms).

A physical examination made on April 2nd revealed large moist rales with vesicular breathing all over; the area of dullness in front considerably reduced, respiration hardly dyspnoeic any more. Patient was able to lie with the head lower than before, temperature between 100 and 101, pulse came down to 120. In spite of this she felt weak, had little appetite, vomited frequently, especially medicines. No sweats. Sputum stained

with carbolfuchsin and methylene blue, showed no t. b. bacilli, but diplococci and staphylococci in abundance, also a few chains of streptococci.

Three more pictures taken in the second week of April showed shadows of irregular outlines about three fingers in width to the right of the sternum down to the diaphragm, to the left the heart area was covered by heavy shadows and almost the whole left lung seems to be covered or invaded. It seemed to me, judging from the percussory and ausculatory findings it must be mostly overlapping. The sternal articulation of the left first rib presented an eroded appearance.

A Pirquet proved negative. On April 17th some free fluid in abdomen, frequent evacuations and vomiting; patient deaf and extremities cold.

This brings the history of the case down to date. Now the question of diagnosis comes up. The location of the dullness, the dyspnoea, the swelling, the X-ray picture, point to the anterior mediastinum as the seat of the disease. Aneurysm is easily excluded. Tumors, benign or malignant not so easily. although the sudden onset of symptoms speaks in a general way against tumors, it does not entirely preclude them. One of my patients, a more than usually active, strong boy died suddenly with respiratory symptoms and a post mortem showed a sarcoma of thymus origin sheathing the roots of the big blood vessels and extending over the pericardium. E. Boinet (in Broardel & Gilbert Traité de Médicine, Vol. VIII, p. 286), says of mediastinal tumors: "They have at their outset generally an almost silent period and manifest themselves only by vascular phenomena, caused by compression of the underlying arterial and venous trunks. Later under the influence of the progress of the malignant tumors and the secondary lymphnode involvement the nerves and the tracheobronchial frontal plane become affected. Their invasion into the mediastinal ganglia and the surrounding areolar tissue increase the number and intensity of the pressure symptoms. * * * * These nerves and respiratory symptoms can come up quite suddenly in certain forms of tracheobronchial lymphnode involvement."

In this connection it might be of interest to quote what this author, who has made an unusually exhaustive study of the normal and morbid anatomy of the mediastinum and especially of the complicated system of the lymphganglia has to say about certain groups of them.

"The pretracheal and bronchial nodes on the right side form a group more important than on the left and are more especially subject to hypertrophy and degeneration. They occupy the angle between the trachea and right bronchus and are continuous with the right tracheal nodes and the chain accompanying the internal mammary vessels; they lodge in the recess between the angle of bifurcation of the upper vena cava and the lower concave edge of the right subclavia, etc."

These facts may have something to do with the earlier radiographic appearance of the shadow on the right side in the present case.

In the course of his minute description of the various groups and chains and their manifold anastomoses Boinet says of the peribronchial groups, that they are lodged in the angles of the bronchial ramification down to their fourth divisions, which suggests the route by which the pathologic process seems to have, in my case, advanced into the lung parenchyma.

However, the great suddenness of the outbreak and the fever, and the simultaneous appearance of the lump on both sides of the sternum are decidedly against the probability of a neoplasma in the ordinary sense of the word. Besides, primary neoplasmata in this location are decidedly much rarer than secondary ones, and we have no knowledge of a primary focus in this instance. The blood pictures also point more to diseased functions of hematopoietic apparatus.

Assuming, then, disease as contrasted with neoplasma of the lymphatic apparatus of the mediastinum, what is the most probable etiology? Lues may be dismissed. The woman has borne six healthy children in quick succession and gives no history of previous illness. There was sudden onset and high fever, also breaking down of inflamed lymphatic glands. Tuberculosis has greater probability, but we cannot demonstrate a primary focus in the lungs or any other organ tributary to the mediastinal lymphatic apparatus. Still, Rilliez-Barthez, among older authors, says that in one-eighth of the cases of tuberculosis of the mediastinum, no primary focus was found post mortem. Of newer ones, I quote Warthin (in Osler, Vol. II, page 743), who says: "Tuberculosis of the bronchial nodes may be primary, the bacilli either passing the lungs without exciting lesions there, or they are brought to the nodes through the thoracic duct. Secondary involvement occurs in tuberculosis of the lungs, cervical nodes, vertebrae, ribs, sternum, clavicle, mammary glands, etc." "Some writers hold that the entrance of tubercle bacilli into the lymph in any part of the body may cause tuberculosis of the bronchial nodes. Bacilli taken through the intestinal mucosa without producing any lesion in it may be carried through the thoracic duct and through the lungs to excite first in the bronchial nodes the characteristic lesions of tuberculosis."

Further, he describes a large complex of symptoms similar to those described in the foregoing history of the present case and mentions among the possible terminations perforation into the various neighboring organs, caseous pneumonia, general miliary tuberculosis and tubercular meningitis. Here again the demands of a strict diagnosis are not satisfied. Simple lymphadenitis may be left out of consideration in view of the malignant and progressive character of the trouble and the absence of a primary focus. It cannot be denied, however, that parturition may have supplied some infective agent without any noticable local lesions.

Hodgkins' disease might be thought of, but the separate non-inflammatory character of the lump, their absence from the sides of the neck,

axilla, etc., makes this improbable, although cases confined to mediastinum are mentioned by writers on the subject.

Lymphosarcoma, a tumor arising from the lymphoid tissue of the lymphnodes and first shown to be a distinct pathological entity by my teacher Kundrat, cannot be excluded. Sometimes it is a localized growth, sometimes it spreads in the alimentary canal and involves the serous surfaces. Its superficial lumps show an infiltrating and immovable character, as in the present case, where the excised piece shows some muscular tissue, probably from the sterno-mastoid, and the lately developed bowel trouble and some free fluid in the abdomen makes some such infiltration probable. The apparent malignancy is also in favor of this diagnosis. Kundrat says lymphosarcoma is more malignant than any carnicinoma; even thorough extirpation of the first lesion would not give the patient any reprieve, the invasion goes on without any stop. Our microscopical examination has not given any pathognomonic findings, and so the exact diagnosis will be a matter of post mortem, towards which the patient seems to be drifting very rapidly.

P. S.—Death took place on April 18th. The post mortem revealed infiltration of the mediastinal glands around the bronchi extending to the oesophagus and posterior pericardium; lungs free except at hilus. The free fluid in the abdomen noticed during the last few days of patient's illness proved to be a sero-fibrinous exudate. Pelvic organs normal. The microscopical findings proved the lesions to be tubercular. The process seems to have advanced from mediastinum into the lungs.

ANNUAL MEETING OF THE ARIZONA MEDICAL ASSOCIATION

The next annual session of the Arizona State Medical Association will be held in Douglas on April 18th and 19th. This is the first time since 1912 that the convention has been held in the southern county, and a record breaking attendance is expected. The personnel of the Association is as follows:

President:—Dr. Robt. Ferguson, Bisbee, Ariz.
1st Vice-Pres.:—Dr. W. Warner Watkins, Phoenix, Ariz.
2nd Vice-Pres.:—Dr. F. T. Wright, Douglas, Ariz.
Secretary:—Dr. C. E. Yount, Prescott, Ariz.
Treasurer:—Dr. R. D. Kennedy, Globe, Ariz.
Councillors:—Dr. E. R. McPheeters, Clifton; Dr. R. F. Palmer, Mesa; Dr. W. H. Bucher, Kingman.

Committee on Public Policy and Legislation:—Dr. W. Warner Watkins, Dr. W. A. Holt and Dr. F. T. Wright.

Committee on Scientific Work:—Dr. E. W. Adamson, Dr. J. I. Butler and Dr. Roy E. Thomas.

Committee on Public Health and Education:—Dr. R. N. Looney, Dr. R. E. Herendeen, Dr. W. V. Whitmore, Dr. C. T. Sturgeon and Dr. E. S. Godfrey.

The Association of State, County and City Health Officers of Arizona will meet in Douglas on Monday, April 16th and the Arizona Association for the Study and Prevention of Tuberculosis will meet there on Tuesday, April 17th.

A proposed innovation for this meeting, is a golf tournament, in which the members of the Association and visiting guests will be eligible. The crack players of the various country clubs of Phoenix, Tucson, Bisbee, Douglas and El Paso are doctors, and an interesting tournament can be held. The elegant course of the Douglas Country Club will be available for this purpose.

A HOME FOR FEEBLE-MINDED IN ARIZONA.

In passing a bill for the establishment of a colony and home for feeble-minded in Arizona, the legislature of that State, now in session, would take an advanced stand among the States of the Union. Such a bill has been presented by Mrs. Pauline O'Neill, member of the lower House from Maricopa County. The bill has the endorsement of the Maricopa County Medical Society and the Legislative Committee of the Arizona

State Association. It is carefully drawn, with the assistance of Judge R. L. Stanford, of the Superior Court of Maricopa County, and it would be a credit to this State if it should pass.

A recent authoritative survey of the State revealed the fact that we have over a thousand children of school age who are so feeble-minded that the teachers in the school could state positively that they are so afflicted. This percentage is no larger than that of any other State, and every state should have such a Home.

The day has passed when an intelligent community can, without shame, ignore the existence of feeble-mindedness and continue to punish where they should teach, make outcasts of those whom they should house and train, turn loose on society those whom they should segregate and treat with consideration. W. W. W.

CONSERVATION OF VISION

Through the influence of Dr. Ancil Martin of Phoenix, who is the Arizona member of the National Committee for the Conservation of Vision of the American Medical Association, several worthy bills have been introduced into the Arizona State Legislature. These have for their object the co-operation of the school authorities and teachers of the State in reporting promptly to the State Health Department, cases of defective vision. These bills have the endorsement and support of the school authorities and, if passed, will immeasurably aid the work of this Committee in this State. W. W. W.

NEWS AND PERSONALS

Dr. Henri Letord, of El Paso, was chosen President of the Southwestern Dental Society, at its recent meeting. Dr. E. J. Alger, of Albuquerque, N. M., was elected first Vice-President, and Dr. J. M. Ridley, of El Paso, second Vice-President. Dr. R. H. Gudger, of Silver City, New Mexico, was continued in his office as Secretary-Treasurer. Forty-five dentists attended the convention.

Dr. W. C. Kluttz, City Health Officer, of El Paso, died January 4th, 1917, aged 39 years. He graduated from the University of North Carolina, in 1895, and received his doctor's degree from the University of Pennsylvania, in 1899. He was an interne in Blockley Hospital, Philadelphia, for two years, and later did post-graduate work in Germany. A wife and two small children survive him. Dr. Kluttz was an earnest

student of medicine, a judicious and painstaking physician, and a man of sterling worth. He had the respect and adimiration of all who knew him.

The following are the newly elected officers of the El Paso County Medical Society for 1917:

President, John W. Tappan,
Vice-President, J. M. Richmond.
Sec.-Treas., Paul Gallagher.
Board of Censors: W. R. Jamieson, D. W. Detwiler.
Milk Commission: H. Thompson, T. J. McCamant.
Associate-Editor, Southwestern Medicine, G. Werley.
Business Manager, Southwestern Medicine, B. E. Galloway.

Jas. Vance and F. P. Miller to serve on the Board of Trustees of the new medical journal.

Dr. J. W. Laws of Lincoln, N. M., was on professional visit to El Paso on February 4th.

Dr. G. H. Moody, of the Moody Sanitarium, San Antonio, Texas, was in the city visiting on a short vacation.

Dr. T. J. McCamant has been appointed county health officer of El Paso County.

Dr. B. M. Worsham has been appointed to the police commission of El Paso.

El Paso Chapter of Red Cross association held a rally on February 8th at the First Christian Church, which was very largely attended, all the seating capacity of the church being taken up and others turned away. Major General John J. Pershing was principal speaker. The El Paso Chapter hopes to increase its membership to 5,000 within the next few months.

Dr. Hugh Crouse and Miss Maud Austin of El Paso were married in Los Angeles the first part of November, 1916, going from there to the Hawaiian Islands to spend their honeymoon. They returned to El Paso on December 12th.

Dr. G. N. Thomas has resigned as county physician of El Paso County.

Dr. O. E. Brown, division surgeon of the El Paso & Southwestern, at Tucumcari, N. M., was on a professional trip to El Paso during February.

Dr. H. James of Phoenix was a visitor in El Paso on February 12th.

Dr. C. M. Hendricks made a professional trip to Kansas City, Feb. 9th.

The spring program of the Maricopa County (Ariz.) Medical Society is as follows:

Feb. 27th.—The Medical Expert:—Dr. Win Wylie. New Theory of Bronchial Asthma:—Dr. O. H. Brown.

March 3rd.—Typhus Fever:—Dr. F. H. Redewill. Treatment of New Growths by the Dessication Method:—Dr. W. H. Sargent.

March 10th.—Toxic Amblyopia:—Dr. D. F. Harbridge. (Not Announced)—Dr. A. H. Williams.

March 17th:—Inspection of School Children:—Dr. J. M. Pearson. Subacromial Bursitis:—Dr. G. E. Goodrich.

March 24th.—Roentengen Diagnosis of Non-Tuberculous Diseases of the Lung (Lantern Slides.)—Dr. W. W. Watkins.

March 31st.—Care of Infants:—Dr. Marian Williams. Nasal Reflex Neurosis:—Dr. McLoone.

April 7th.— Tuberculous Infection:—Dr. R. R. Brownfield. (Not announced):—Dr. O. E. Plath.

April 14th.—Roentgen Diagnosis of Appendicitis and Cholecystitis (Lantern Slides):—Dr. W. W. Watkins.

Among the recent additions to the medical fraternity of this Society are the following:

Dr. Geo. E. Goodrich, formerly Assistant Surgeon to the Detroit Copper Co., of Morenci, and well known throughout Arizona, after endeavoring for two years to content himself in Illinois, has returned to this State and located in Phoenix, where he will engage in the practice of surgery.

Dr. Kimball Bannister, after two years interneship in Cook County Hospital, has located in Phoenix where he will be associated with Dr. R. W. Craig.

Dr. Orville H. Brown, formerly Assistant Professor of Medicine of St. Louis University, has located in Phoenix, where he will confine his practice to internal medicine, being associated with Dr. W. O. Sweek.

Dr. S. D. Whiting has been placed in charge of the United States Indian School Sanatorium at Phoenix. Dr. Whiting is thoroughly prepared for his work, among qualifications being eighteen months spent with Dr. F. M. Pottenger at Monrovia, Calif.

The only medical man in the Third Arizona Legislature is Dr. Ray Ferguson of Patagonia, who is a member of the lower house from Santa Cruz County.

The McKinley County, New Mexico, Medical Society has named the following officers for the ensuing year:

President, Doctor A. H. DeLong, Gallup.
Vice-President, Doctor W. B. Cantrell, Gallup.
Secretary, Doctor William Hutchinson, Gibson.
Treasurer, Doctor J. M. Boyle, Gallup.
Delegate to State Society, Doctor C. J. Laffin, Gallup.
Censors:
Doctor Dwight Allison, Gallup, 3 years.
Doctor A. C. Pratt, Gallup, 2 years.
Doctor W. B. Cantrell, Gallup, 1 year.

The Bernalillo County, New Mexico, Medical Society recently elected the following officers: President, Doctor J. C. Cipes, Albuquerque; Vice-President, Doctor F. F. Fadeley, Albuquerque; Secretary, Doctor F. E. Tull, Albuquerque.

The Dona Ana County Medical Society has elected the following officers for the year 1917: President, Doctor R. E. McBride, Las Cruces; Vice-President, Doctor J. N. Minetree, Las Cruces; Secretary-Treasurer, Doctor T. C. Sexton, Las Cruces.

The next annual meeting of the New Mexico Medical Society will be held in Las Cruces in the fall of 1917.